

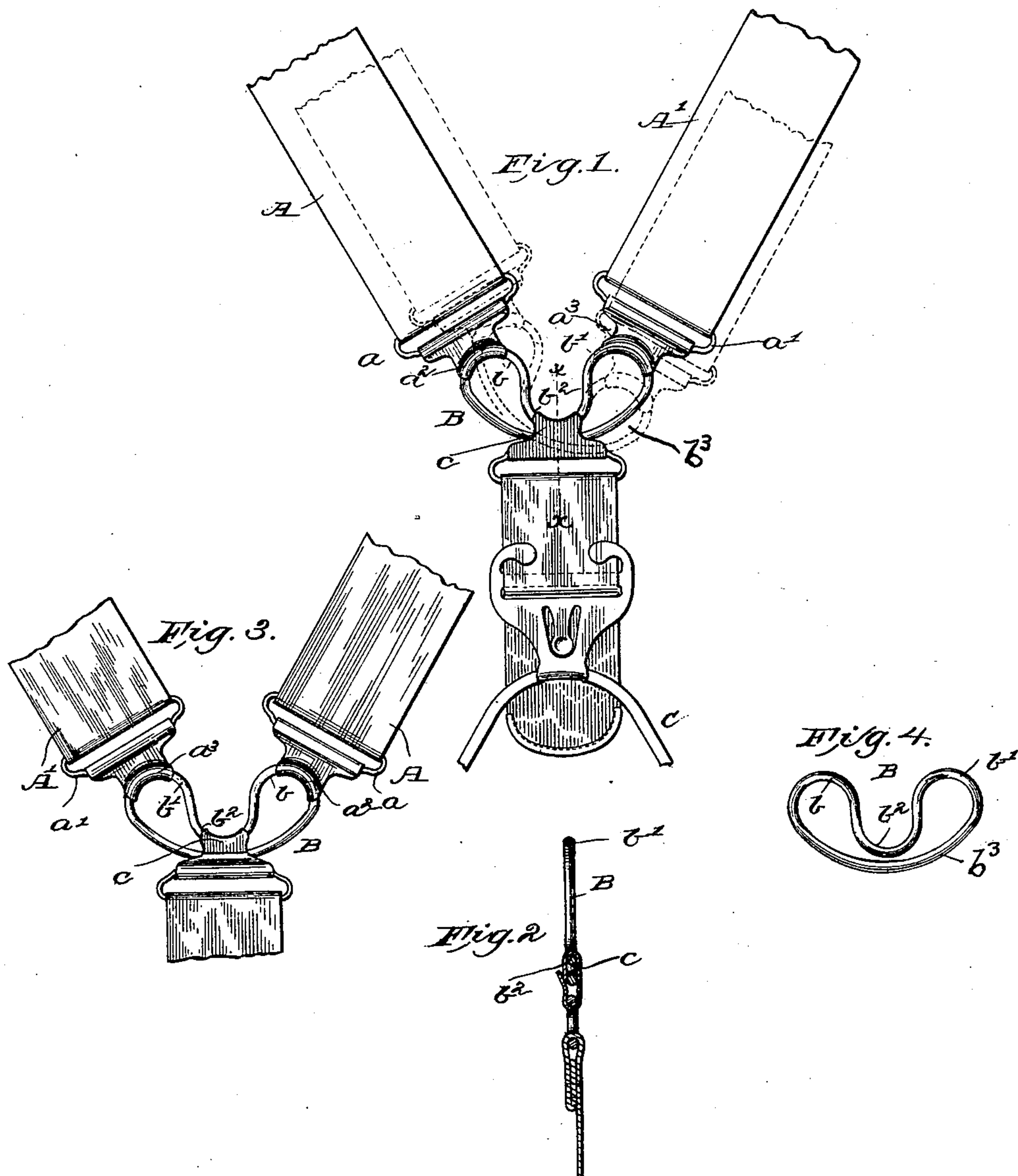
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Patented July 2, 1901.

A. M. ZIEGLER.
SUSPENDERS.

(Application filed July 9, 1900.)

(No Model.)



Witnesses
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UNITED STATES PATENT OFFICE.

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SUSPENDERS.

SPECIFICATION forming part of Letters Patent No. 677,841, dated July 2, 1901.

Application filed July 9, 1900. Serial No. 22,896. (No model.)

To all whom it may concern:

Be it known that I, ALFRED M. ZIEGLER, a citizen of the United States, and a resident of Boston, county of Suffolk, State of Massachusetts, have invented an Improvement in Suspenders, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

10 This invention has for its object the production of a novel connection for use in the back of suspenders, it joining the usual shoulder-straps with the back strap, the aim of my invention being to provide a compensating
15 connection or one adapted to instantly adapt itself to shoulder motions.

In accordance with my invention I connect the ends of the shoulder-straps and the back end of the suspender by a rigid-trussed swinging and sliding loop, the latter moving with
20 relation to the back strap as the loop adapts itself to unequal shoulder motions and at the same time the loop sliding with relation to the shoulder-straps, the connection and disposition of parts being such that the loop
25 swings or moves about a fixed center of motion and maintains the perpendicular distance between each shoulder-strap at the point where it connects with the loop and the
30 vertical line of resistance of the back end equal in all positions of the loop, so that the shoulder-straps acting always on equal lever-arms on opposite sides of the back end will
35 readily cause the loop to adjust itself under slightly unequal strains and prevent jamming thereof at all times. My loop, that it may
operate as specified, presents three arcs and a strengthening member—viz., a central arc
40 to afford connection with the back strap, and at each side thereof an arc the reverse of the central arc, each side arc being opposed to the central arc and each serving to connect
with one of the shoulder-straps, and a brace or strengthening member which connects the
45 ends of the side arcs.

My invention in suspenders therefore consists in shoulder-straps, a back end, and a rigid-trussed swinging and sliding loop or link moving about a fixed center of motion
50 loosely connecting said straps and end, where-

by unequal shoulder motions may be compensated for by the sliding and swinging motion of the link with relation to the back end.

Figure 1 shows a sufficient portion of the back of a pair of suspenders with my improvements added to enable my invention to be understood. Fig. 2 is a section in the line x , Fig. 1. Fig. 3 is a rear side view, and Fig. 4
55 shows the loop B detached.

In the drawings, A A' represent shoulder-
60 straps having, as shown, metallic end pieces a a' , provided with hooks a^2 a^3 of arc shape where they engage the loop B. The back end C, which may be of any suitable construction so long as it presents two portions hav-
65 ing suitable buttonholes to engage buttons at the back of the waistband, has at its upper end a hook or other usual eye c , which is of a peculiar form and is sustained upon the loop B, as hereinafter described. The loop B is a
70 rigid metallic loop and is in the nature of compound or double-trussed loop, it having the two end arcs b b' , which are engaged, respectively, by the hooks a^2 a^3 , the central
75 arc b^2 , which is approximately a semicircle and on which is supported the eye c of the back end C, and the brace or strengthening member b^3 , which connects the ends of the
80 arcs b b' , as seen in Fig. 4. The eye c incloses both the arc b^2 and the brace or strengthening member b^3 , the portion of the eye which
bears upon the arc b^2 being broad and curved to fit the curvature of the arc b^2 , as plainly
85 seen in the drawings. The function of the strengthening member b^3 is to make the loop perfectly rigid and stiff, even when subjected
to a maximum strain, the said strengthening member acting as a truss member and making the loop what might be called a "trussed"
90 loop.

A loop constructed as above described will
95 withstand any strain to which it may be subjected without bending or buckling. The back end is thus loosely suspended on the middle arc b^2 of the loop, and the two reverse
arcs b b' at opposite sides of the middle arc have connected with them loosely the shoulder-straps, and since the central arc b^2 is approximately a semicircle and the eye c is
100 curved to fit the same it will be evident that

any unequal shoulder motion will cause the said loop to slide through the eye c , and thus swing it with reference to the back piece, as plainly seen in dotted lines in Fig. 1, the broad bearing portion of the eye by its engagement with the semicircular form of the arc b^2 causing the said loop to move bodily in the arc of a circle about a fixed center, which is the center of the semicircular arc. Upon reference to Fig. 4 it will be seen that the center of the semicircular arc b^2 is below the upper portions of the arcs $b b'$, and therefore the center of motion of the loop or link is between the upper and lower portions thereof, and by reason of the fact that the radius of the arc b^2 is comparatively small and the said loop swings in the arc of a circle the motion thereof in compensating for unequal shoulder motion will be smooth and easy. This swinging and sliding motion of the loop B operates to not only vary the position of the ends of the shoulder-straps in a longitudinal direction to thereby compensate for the unequal shoulder motion, but because of the rigidity of the said trussed loop the ends thereof are retained at a constant distance apart. Hence such swinging movement gives to the ends of the shoulder-straps a lateral movement, as indicated in dotted lines in Fig. 1, whereby the suspenders as a whole may perfectly accommodate themselves to the movements of the body of the wearer.

The structure may be modified in various ways without departing from the spirit of my invention.

From the construction described it will be noted that the central arc is wholly between the end arcs to which the shoulder-straps are connected and that the curve and disposition of these parts is such that in all positions of the sliding loop under the varying strains and unequal movement imparted thereto the lever-arms of the end arcs positively remain the same with respect to the connection with the back end. In other words, as the loop slides through the eye c the perpendicular distance between the hook a^3 and the line of resistance of the back end, which may be assumed to be the line $x x$, for instance, in Fig. 1, will be the same as the perpendicular distance between the hook a^3 and said line $x x$, the effect of which is that the loop will always yield or slide through the eye c under slight changes of strain on the shoulder-straps and may never become jammed or inoperative.

Having fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In suspenders, shoulder-straps, a back end and a rigid loop connecting said shoulder-straps and back end, said rigid loop comprising two end arcs to which the shoulder-straps are connected, and a central arc between the two end arcs, and a sliding connection between the said central arc and the back end, the curve and disposition of parts being such

that the lever-arms of the end arcs with respect to the back end remain substantially the same throughout different positions of the loop.

2. In suspenders, shoulder-straps, a back end and a rigid loop connecting said shoulder-straps and back end, said rigid loop comprising two end arcs to which the shoulder-straps are connected, a central arc between the two end arcs, and a brace joining the two end arcs, and a sliding connection between the said central arc and the back end, the curve and disposition of parts being such that the lever-arms of the end arcs on either side of the back end remain substantially equal throughout different positions of the loop.

3. A suspender comprising in its construction shoulder-straps provided with hooks, and a back piece provided with an eye, and a rigid loop slidably connecting the hooks with the eye, said loop having two end arcs in engagement with the hooks and a central arc in sliding connection with the eye, the said central arc being curved and disposed with relation to the end arcs to maintain the lever-arms of the end arcs on opposite sides of the back piece substantially equal throughout different positions of the loop whereby the loop may readily adjust itself under slight varying strains on the shoulder-straps.

4. In suspenders, shoulder-straps, a back end and a rigid loop connecting said shoulder-straps and back end, said loop having at its end arcs which are loosely connected to the ends of the shoulder-straps, and in its central portion a curved back forming approximately a semicircle, the back end having an eye suspended on said semicircular curve, said eye having a broad bearing-surface which is curved to fit the said semicircular curve whereby unequal shoulder motion causes the loop to slide through the eye and swing bodily in an arc of a circle the center of which is the center of the semicircular arc.

5. In suspenders, shoulder-straps, a back end and a rigid loop uniting the shoulder-straps and back end, said loop presenting at each end two similar upwardly-curved portions, means for loosely connecting the same to the shoulder-straps, and a central downwardly-curved portion forming a semicircle upon which the eye on the back piece is supported, said eye having a broad bearing-surface and being fitted to a semicircular curved portion, the construction being such that unequal shoulder motion causes the loop to swing bodily through the eye on the back end in the arc of a circle whose center is the center of the semicircle.

6. In suspenders, shoulder-straps, a back end and a rigid loop, said loop having at its ends upwardly-curved arcs which are loosely connected to the ends of the shoulder-straps, and in its central portion a downwardly-curved arc forming approximately a semicircle the center of which is below the upper

portions of the end arcs, the back end having an eye suspended on said semicircular portion and provided with a broad bearing-surface, said bearing-surface being curved to
5 fit the semicircular portion of the loop, whereby unequal shoulder motions cause the loop to swing bodily in an arc whose center is the center of the semicircular portion.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ALFRED M. ZIEGLER.

Witnesses:

GEO. W. GREGORY,
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