C. H. CUSHMAN.

Combined Shoulder Brace and Suspenders.

No. 201,597. Patented March 26, 1878.

Fig. 1.

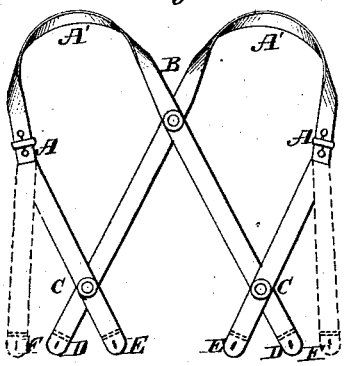


Fig. 2.

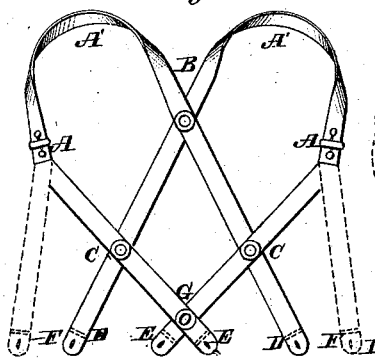


Fig. 3.

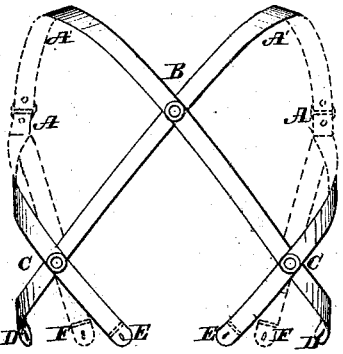


Fig. 4.

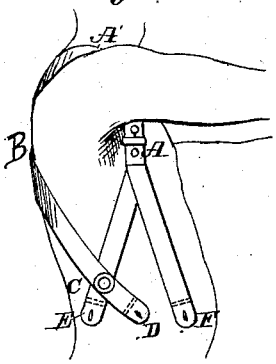


Fig. 5.

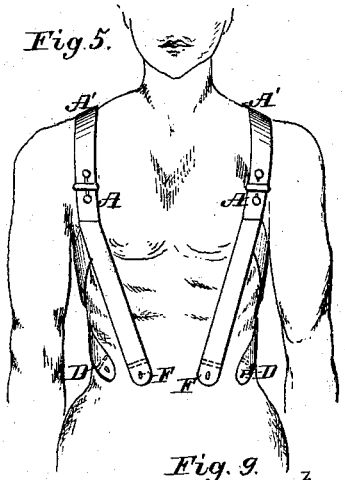


Fig. 6.

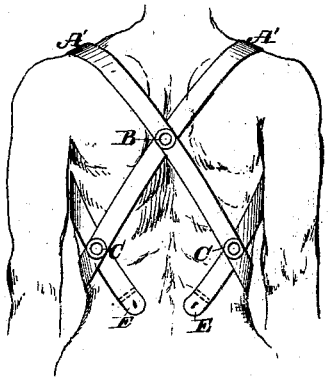


Fig. 7.

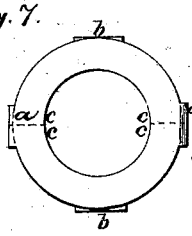


Fig. 8.

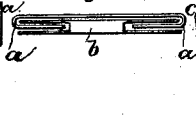


Fig. 9.

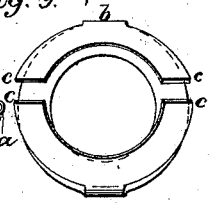


Fig. 10

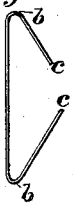


Fig. 15.

Fig. 11.

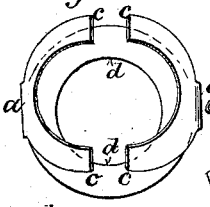


Fig. 12.

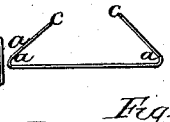


Fig. 13.

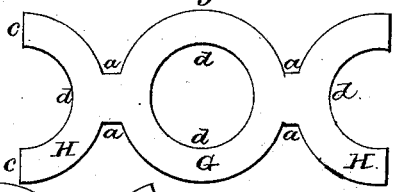
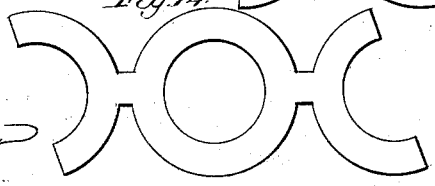


Fig. 14.



Attest.

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UNITED STATES PATENT OFFICE.

CHARLES H. CUSHMAN, OF ERIE, PENNSYLVANIA.

IMPROVEMENT IN COMBINED SHOULDER-BRACE AND SUSPENDERS.

Specification forming part of Letters Patent No. **201,597**, dated March 26, 1878; application filed November 23, 1877.

To all whom it may concern:

Be it known that I, CHARLES H. CUSHMAN, of the city of Erie, in the county of Erie and State of Pennsylvania, have invented a new and useful Improvement in Shoulder-Braces and Suspenders Combined, of which the following is a specification:

This invention relates to shoulder-braces (commonly so called) for restraining and correcting the improper carriage of the upper part of the body, known as "stooping," "round shouldered," &c., and to suspenders for supporting garments on the body.

Such braces have generally been so constructed as to be objectionable, first, on account of irksomeness and cumbersomeness, owing to the amount of material employed, the degree of restraint applied in their action, and the unyielding character of construction and application to the wearer; secondly, on account of the irritation, pain, and oftentimes actual soreness produced, especially in the hollow around and under the arm-pit, by the straps passing over that locality, resulting partly from its ligature character, partly from chafe, especially when moistened by perspiration, and partly from the tenderness of that part; thirdly, on account of the obstruction to circulation when tightened so as to be effective as intended; fourthly, on account of their mode of operation, which is by a considerable and constant backward pull and support to the shoulders, entirely relieving the muscles proper to that position, instead of encouraging the action of and producing additional strength in those muscles; and, fifthly, because they entirely fail to operate on the lumbar muscles and abdomen, the relaxation and protuberance of which are essential parts of stooping especially, such braces being usually and practically applied across the back on the line of the shoulders only.

Such suspenders have generally been so constructed as to support the garments irregularly, to restrain to a certain extent the motions of the body by lack of free play of the parts fastened together at one or more points of intersection, and by the arrangement of the parts to press down in the hollows between neck and shoulders and over the breasts, so as to be uncomfortable, and induce stooping, &c.

The object of my invention was and is primarily to produce in reality a substitute for shoulder-braces which, by the arrangement of the several parts of the material used, should operate to encourage and induce a proper carriage of the upper part of the body by the exercise and consequent strengthening of all the muscles proper to that end, act as a support or stay only so far as was necessarily consequent upon this arrangement, and accommodate fully all persistent and intentional movements of the body, at the same time that they should be as light and airy as possible, and free from irksomeness and chafe to the wearer. Incidentally the braces act as suspenders, free from the objections and defects named above.

The invention consists, then, first, of an arrangement of or disposition of the material used for the braces and suspenders, such as to effect the action described in the proper manner and at the proper points; and, second, in a device for retaining the different parts of the material in proper relation over and under each other where they cross, while admitting the necessary movement over each other and around the point of intersection.

In the accompanying drawings, Figure 1 is a plan of the braces and suspenders spread out back upward, so as to show the arrangement of the parts and the position and application of the device referred to, the full lines showing the style with two ends or points of attachment on each side, and the broken lines a third end or point of attachment, to be provided if taste or necessity require, especially in the case of corpulent persons. Fig. 2 is a plan of a modification of the last for producing a stronger support and corrective for persons of weak back. Fig. 3 is an elevation of the braces, &c., in the style which I suppose to be most generally used, as if in position upon the body. Figs. 4, 5, and 6 are, respectively, side, front, and back elevations of the last as in position on the body. Figs. 7 and 8 are, respectively, a plan and a vertical section (through one diameter of the plan) of the device for keeping the parts in proper rela-

tion, finished ready for use. Figs. 9 and 11 are perspectives of the two exactly similar parts of the same ready for putting together, with corresponding diameters at right angles to each other, as when put together. Figs. 10 and 12 are sections of the last two through their corresponding relative diameters. Fig. 13 is a plan of one of these parts as it is cut or struck out of the metal or other material used. Figs. 14 and 15 are, respectively, a plan of one of the parts of the guide-clasp, with the half-disks cut upon an oblique instead of a right diameter, and an elevation, showing manner of putting parts together in that case.

I will first describe the arrangement of the material used for the braces, &c.

The main straps pass from a point, A, Figs. 1 to 5, inclusive, a little in front of and about on a line with the armpits on each side, upward to the points A′, Figs. 1 to 6, inclusive, on the proper shoulder a little inside of the joint, the outer edge really touching the joint; thence obliquely backward over the proper shoulder and toward the opposite one; thence obliquely downward and across the back, Figs. 1, 2, 3, and 6, passing over the upper point of the proper shoulder-blade, intersecting between the shoulders, but a little below them at B; thence passing over the lower point of the opposite shoulder-blade, over the lumbar muscles of the opposite side, Figs. 3, 4, and 6, at the point C; thence partly around that side of the body to a point of attachment to the waist-belt of the proper garment, or one worn for the purpose, D, Figs. 3, 4, and 5, the direction of these straps at D being such that, if continued, they would pass obliquely downward and across the abdomen, and, meeting, would form a band for its support.

The subordinate straps, when but two ends on each side are used, are secured to their respective main straps on each side at A, Figs. 1 to 5, inclusive, by any proper device, and pass thence obliquely downward and backward around the proper side, Figs. 3, 4, and 5, across the lumbar muscles on that side, and intersecting with the opposite main strap at the point C, Figs. 3, 4, and 6; thence to points of attachment to the waist-belt at E, Figs. 1, 3, and 6, a little on their own side of the middle line of the back, their direction at E being such that, if continued, they would pass obliquely down and around the opposite side and across the abdomen, about at the same point with and nearly in the same direction with their respective main straps.

When three ends or points of attachment are used, (broken lines A F, Figs. 1 and 2, dotted lines A F, Fig. 3, and full lines A F, Figs. 4 and 5,) this subordinate strap, instead of being fastened at A, is passed through any proper device at that point, and continued to a point of attachment, F, on the waist-belt a little farther from the middle line of the front than customary with suspenders, which have the third end on each side. Fig. 3 illustrates this style or modification, which I suppose to be most commonly preferred, and is the general illustration of the invention. When a more powerful support and more positive check to the habit of stooping, &c., is desired, the subordinate straps A E, A E, or F A E, F A E, Fig. 2, are crossed at G, each to the point of attachment of the other before described.

By considering this arrangement of the parts of the material used, it will be seen that unavoidably a pressure, which is, however, very slight, will be produced by the main straps in opposition to any throwing forward of the shoulder-joints just below A′, Fig. 5, to any projection outward of the shoulder-blades, or at C of the lumbar muscles, Figs. 6 and 4, and when the braces are attached to articles like pantaloons or drawers of males, or to any substitute for the upper part of such for females or males, this pressure will be communicated to the abdomen through such garment or substitute from the points D. The subordinate straps A E or A E F contribute to this pressure, which opposes the throwing forward of the shoulder-joint and the throwing out at C of the lumbar muscles. This unavoidable pressure of the braces upon these points, even when worn by persons of erect carriage, is, however, but very slight, amounting only to a gentle stay or support, except when the ends E are crossed at G, Fig. 2, when it becomes more positive, and in the incidental or primary use as suspenders, while the garments are properly and equably supported, is agreeable rather than irksome. At the same time, when the articles are worn either as braces or suspenders, all the parts have all the necessary play in any direction to accommodate any persistent and intentional motion of the body by the exercise of the proper muscles for that motion, instead of by the relaxation of other muscles, especially that in leaning forward, the subordinate straps A E, A E, or F A E, F A E, being slackened in the direction of E A, allow the back part of the garment to accommodate itself to the downward pull from E E; also, it will be seen that the portions A A′, being well out on the shoulder, and at A well out from the swell of the breasts, while at the same time entirely clear of the armpits, or the angle just in front of and above them, produce no irritating or inconvenient pressure at either of those points; and, finally, that the whole arrangement is light, and without cumbersomeness or obstruction to ventilation of the body.

When, now, these braces are worn as such by persons inclined to stoop, to round the shoulders, or to flatten in the chest, so soon as this tendency begins to operate, the slight pressure, support, or stay at the points described is increased to a decided check, inducing the return of each point or part of the body to a proper position, and, incidentally, a projection of the chest and a retraction of the abdomen by the exercise of the various muscles proper to those ends, thus producing a correct, healthy, and graceful carriage of the

body above the hips. It will be found, in addition, that indirectly this position will conduce to the proper carriage of the head, and to the elastic step from the hip, so essential to easy walking.

I proceed now to describe the device which I call a "double guide clasp," by which the parts of the material are held in proper relation without obstructing necessary play upon and around the points of intersection. This is formed of two exactly similar parts, one of which is shown in plan, Fig. 13, consisting each of a circular disk, G, connected on each side at *a a* (or *b b* in the other half, if shown) with a half-disk, H, of the same diameter, by a narrow strip continuation of the material, (usually metal) used in its production.

These disks and half-disks are given an annular form, for lightness and convenience of interlocking, by striking out disks and half-disks in their centers.

The half-disks *c a a c* are turned around *a a* or *b b* as an axis, partly upon the whole disks, as shown in Figs. 9, 10, 11, and 12.

The ends *c c* of Figs. 11 and 12, for example, the part in Fig. 11 being turned over for the purpose, are now inserted or hooked under the sides of the half-disks of the part in Figs. 9 and 10, and reciprocally for these latter. The parts are then flattened toward each other, the half-disks of each being between the whole and half-disks of the other, and, mandrels being inserted between the whole disks of each and the half-disks of the other to preserve space and give form, the parts are fully flattened down to the shape of the finished guide-clasp, as shown in Figs. 7 and 8.

The half-disks may also be cut (Fig. 14) upon an oblique instead of a right diameter, such that each shall have one end or leg longer than the other by the width of the connecting-strips on the circumference of the whole disk, the long leg of each on either part of a guide-clasp being on the same side with the short leg of the other. When thus cut the half-disks are turned upon the whole disks, as before; but, in putting the two parts of the clasp together, the long legs of the half-disks of one part are (Fig. 15) sprung under the long legs of those of the other part, and the two parts are then turned upon a common center in opposite directions till the short ends of the one can be sprung under those of the other, so as to interlock, as before. By this form or manner of cutting the half-disks on an oblique diameter instead of a right diameter, and the resulting ability to put the two halves of a clasp together, as described, the character of the clasp is not changed, nor the function thereof, while a decided advantage is gained in the labor of putting the two halves of a clasp together whenever the material is springy or stiff instead of soft, and it will presumably be preferred over the other form or manner of cutting the half-disk or a right diameter, with legs or ends of equal length. Thus is produced a device of two parts held together with spaces, through which strips of material of the proper width and thickness may be passed at angles with each other, be held in proper position to each other, and yet be free to slide lengthwise of each other or turn in their planes about a common intersection a half-circle, less twice the width of the connecting-strips *a a b b*, and which, being used to pass the parts of the material of the braces, &c., through at B, Figs. 1, 2, 3, and 6, at C, Figs. 1, 2, 3, 4, and 6, and at G, Fig. 2, retain those parts in position without preventing necessary play.

The arrangements of material before described, the construction of the guide-clasp, and its application now pointed out constitute my invention.

There are subordinate modifications of the arrangement of material contemplated, such as passing the straps A E through any suitable loop on a waist-belt for females, at D, then through a similar one attached to the main strap, terminating at C, instead of using the guide-clasp there, and thence to E, or of having A E, A E, on one piece, and passing through, in addition, or only a similar loop on the middle of the back of the waist-belt between E E, instead of using the guide-clasp at G. Also, the guide-clasp may be made of wire, or in any modification of the exact form shown which does not interfere with the principle of construction; but, after many experiments, I prefer the arrangement and the form shown and described, as best suiting the object in view, with, perhaps, the exception of the size in special cases of a loop on the middle of waist-belt, and the unity of A E, A E, passing through A, instead of using the guide-clasp at G.

Having thus described my invention, what I claim is—

1. The combined shoulder-brace and suspenders, consisting of the straps A B C D E, constructed and arranged to operate substantially as and for the purpose set forth.

2. The combined shoulder-brace and suspenders, consisting of the straps A B C D E F, constructed and arranged to operate substantially as and for the purpose set forth.

3. The double guide-clasp, composed of two parts, each consisting of the disk G and half-disks H H, constructed and combined to operate substantially as described, and for the purpose set forth.

4. In combination with shoulder-brace or suspender-straps, arranged to cross on the back, the double guide-clasp, constructed as described, for the purpose set forth.

C. H. CUSHMAN.

Witnesses:
JACOB F. WALTHER,
CHS. VIREUBER.