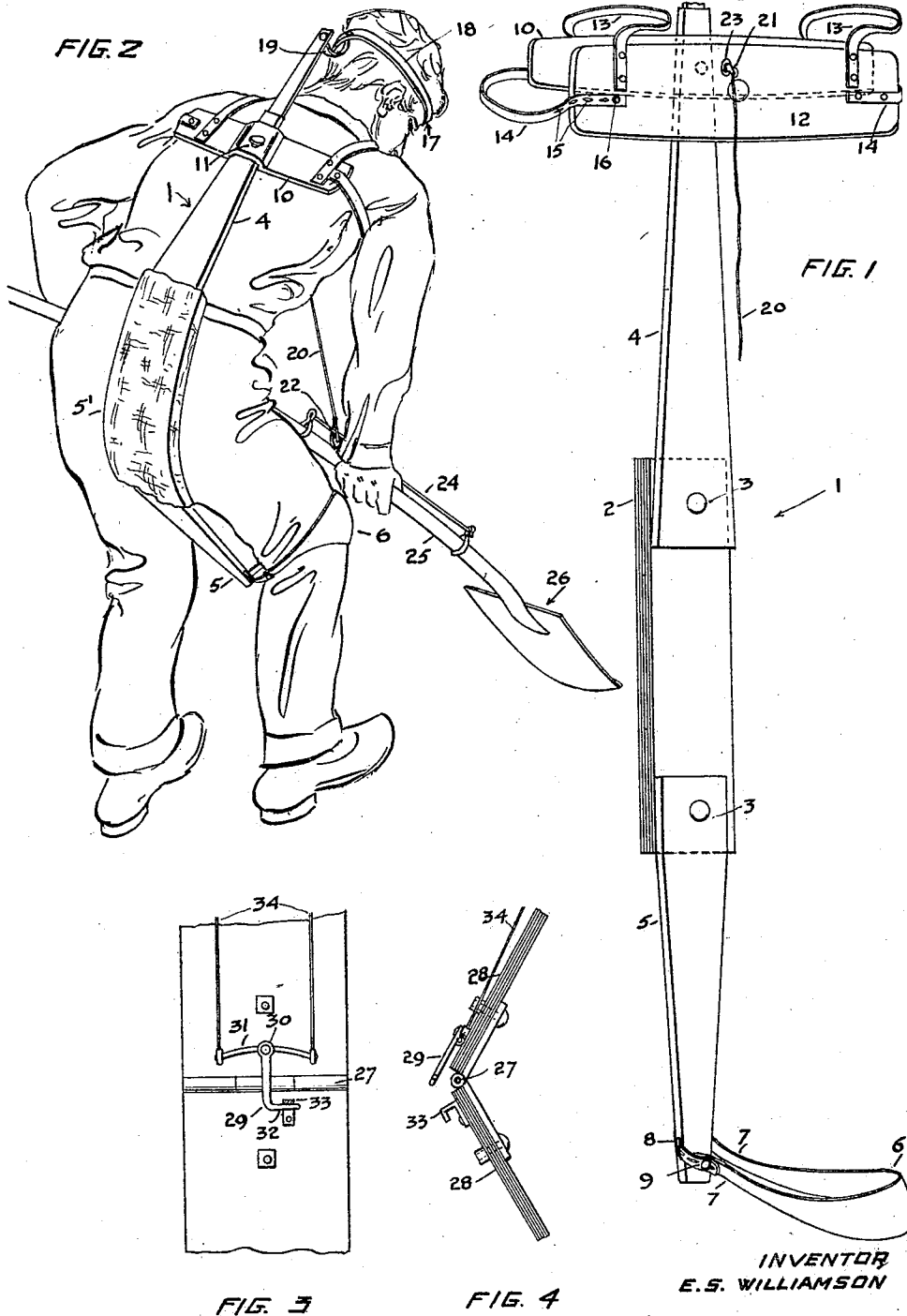


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 SPRING LIFT FOR STOOPERS.
 APPLICATION FILED JAN. 28, 1920.

1,409,326.

Patented Mar. 14, 1922.



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Specification of Letters Patent. Patented Mar. 14, 1922.

Application filed January 23, 1920. Serial No. 354,710.

To all whom it may concern:

Be it known that I, ERNEST S. WILLIAMSON, a subject of Great Britain, residing at Melbourne, Australia, have invented new and useful Improvements in Spring Lifts for Stoopers, of which the following is a specification.

This invention relates to a spring lift or balance device which when worn by laborers and other persons whose work necessitates their repeated bending over or stooping, will relieve the strain on the muscles exercised in bending over, stooping and raising the body to erect position and assist in the raising of the body, all, to the end that the wearer may work with greater rapidity, ease, comfort, and accomplishment without tiring so quickly as ordinarily.

An object of the invention is to provide a device of the character described, which is constructed so that the wearer assumes a sitting position in comfort without necessitating removing the device.

The invention possesses other advantages and features, some of which, with the foregoing will be set forth at length in the following description where I shall outline in full, that form of the invention which I have selected for illustration in the drawings accompanying and forming a part of the present specification. In said drawings I have shown one form of the construction of my invention but it is to be understood that I do not limit myself to such form, since the invention as expressed in the claims may be embodied in a plurality of forms.

Referring to the drawings:—

Figure 1 is a perspective view showing the invention as it would appear when in use.

Figure 2 is a perspective view of the device, removed.

Figure 3 is a detail fragmentary plan view of the hinge and locking means of a modified form of the invention.

Figure 4 is a fragmentary side elevation of the form in Figure 3.

In carrying out my invention I provide an elongated, stiff spring or resilient body member, adapted to be flexed intermediate of its ends and to be worn in upright position on the back, the ends being connected with the upper and lower parts of the body of the wearer on both sides of the trunk of the body. The upper end is connected with the body near the shoulders and the lower

end preferably with the knee of one leg, so that when the wearer bends over or stoops this spring body member is flexed and exerts a tendency to support and balance the bent over portion of the body whereby the muscles ordinarily brought into play to balance and support the body in such position need not be fully exerted and can rest. Likewise in raising the body to erect position this spring body member by its tendency to return to normal position aids the muscles and less exertion of muscular energy is required to raise the body to erect position.

This spring body member attached as described to the wearer together with other features of the device such as the novel means of connecting the body member with the body of the wearer and the details of construction of said body member itself, means of connection between the device and a tool such as a shovel or pick whereby strain on the arms is relieved, and head rest means which relieves neck strains, constitute essential features of this invention.

Referring to the present embodiment of the invention as particularly illustrated in the accompanying drawings 1 designates the elongated resilient or spring body member of the device which is adapted to be worn on the back of the user in upright position and is sufficiently long to permit of its being connected with the body at its upper end adjacent the shoulders and at its lower end adjacent the knees.

This body member comprises a resilient central portion consisting of flat leaf springs 2 mounted one upon the other and bolted loosely as at 3, at their ends to flat rigid extensions 4 and 5 preferably formed of light sheet metal. The length of the spring 2 and extensions 4 and 5 is proportioned preferably so that the upper extension 4 will extend from the waist line to a point between the shoulder blades of the wearer and so that the lower extension 5 will extend from a point adjacent the seat of the trousers downwardly to a point adjacent the knees. The resilient portion or springs may be covered with cloth as at 5'. This leaves the spring portion extending from the waist line to a point below the seat of the trousers whereby when the wearer stoops or bends forwardly the springs will conform to the curve of the body adjacent the seat of the trousers. However, these proportions may

be varied as desired. By having a loose connection between the springs and extensions provision is made for slight lateral play between the parts to accommodate side twisting when the wearer bends or stoops.

I provide means for attaching or connecting the lower extension 5 of the body member with the lower part of the body preferably one leg at the knee. This means comprises a cup-shaped knee cap 6 which may be formed of any suitable material and is connected by preferably flexible straps 7 with the lower end of the extension 5. The cap 6 partially surrounds the leg at the knee and the straps 7 extend on both sides of the knee and through a slot 8 in the lower end of the extension 4. A suitable fastening 9 is provided to secure the straps in position.

Means for connecting the upper extension 4 with the upper part of the body is provided and may comprise a cross piece 10 slidably mounted on the extension slightly below the upper end thereof and held in place by a set screw 11. This cross piece is adapted to extend across the back between the shoulder blades of the wearer and is connected with a breast plate 12 by straps 13. The straps 13 extend over the shoulders and may be of any suitable material provided they support the breast plate so as to engage the wearer at the upper part of the chest. Straps 14 are secured to the ends of the piece 10 and to the ends of the breast plate 12 being adapted to extend through the arm pits. One of the straps 14 is provided with a series of openings 15 at one end whereby it may be adjustably secured upon a fastening 16 on one end of the breast plate. This provides for adjustment of the plates 10 and 12 upon the wearer.

A head rest 17 is secured to the upper end of the extension 4 in any suitable manner and is disposed so as to engage the forehead of the wearer. By leaning on this rest when stooping or bending the wearer may relieve the strain on the neck muscles and rest them. This rest comprises a curved padded band 18 adapted to engage the forehead and sides of the head of the wearer and which is secured by straps 19 to the upper end of the extension 4.

To lessen and remove strains on the arm occasioned when using a shovel, spade, or like implement, I provide a flexible connection, a wire 20 which has a hook 21 on one end and a pulley 22 on the other. The hook 21 hooks into an eye 23 on the breast plate 12 and the pulley rides under a taut wire 24 secured on the handle 25 of the implement 26 shown in Figure 1. The length of this connection or wire 20 is determined by the length of the arms and the character of the implement used. In the case of the shovel or spade 26 the arrangement permits the operator to relax the arms, using them only to

balance the shovel, while the element or wire 20 supports approximately all of the weight of the shovel when the latter is filled. Thus in raising the body to toss or dump the contents of the shovel the spring body member in returning to normal position assists the arms of the operator in lifting the shovel.

To put on the device, the shoulder straps are first slipped over the head, and on to the shoulders so as to bring the body member 1 on the back, the cross piece 10 between the shoulder blades and the breast plate 12 on the upper chest of the wearer. The straps 14 are then fastened to secure the upper portion of the device to the body. The head rest will then assume its operative position with the band in engagement with the forehead. The knee cap is next fitted upon the knee of the leg to be put foremost in working and then secured in place. The device is now secured upon the wearer and ready for use. When the wearer stoops the springs of the body member are flexed and these springs are arranged to exert say for example an 80 lb. pull when so flexed. Thus the wearer will be balanced in stooped position and will not have to exercise those muscles ordinarily used to support and balance the body in this position. As the body is bent or stooped largely by gravitation when a person leans forward, little or no exertion is required to flex the springs. The wearer in raising to upright position will be assisted by the action of the springs returning to normal position and thus need not exercise the muscles such as ordinarily used, to their full extent. The connection between the breast plate and implement relieves arm strain as described and the head rest relieves neck strains. Thus it will be seen that a workman equipped with my device will not tire as easily and can do more work more comfortably and easily.

While a person when wearing the device may sit down without difficulty to lessen the effort required for sitting down I provide as shown in Figures 3 and 4 a hinge 27 intermediate of the ends of the springs 28. To provide for flexing of the springs and for rendering the springs inoperative I employ means in the form of a detent or locking member 29 pivoted as at 30 to one side of the hinge and provided with a cross piece 31 at one end. The other end of this member is curved as at 32 and adapted to extend under a keeper 33 when locking the springs against hinge action. Flexible elements 34 are connected with the cross piece 31 and provide for operating the member 29 to move it into and out of position. These elements 34 may be secured or carried on the body of the wearer in any convenient manner.

The wearer of the device may kneel as would be required in carrying out certain work and in this instance the lower end of

the extension 5 will rest upon the ground so that the intermediate portion together with the extension 5 will act as a seat and most of the weight of the wearer will rest thereon, whereby strain upon the arms, legs and body, such as is ordinarily occasioned, will be relieved.

I claim:—

1. In a device of the character described, a normally substantially straight body member comprising a resilient intermediate portion worn upon the back so that its extremities are disposed adjacent to the waist line and seat of the trousers, rigid non-bendable extensions secured to the extremities of the resilient portion, the free end of said extensions being adapted to lie adjacent the back of the shoulders and backs of the knees of the wearer of the device and means for connecting the said free ends with the body of the wearer adjacent the knees and shoulders.

2. In a device of the character described adapted to be worn upon the back of a person, a body member comprising leaf springs with their extremities disposed adjacent the waist line and seat of the trousers respectively, non-bendable, rigid extensions secured to the ends of the springs, means for securing one of the extensions to one leg of the wearer adjacent the knee, a cross piece on the other extension and adapted to lie upon the back of the wearer adjacent the shoulder blades, a breast plate adapted to engage the breast of the wearer and means of connection between the cross piece and breast plate extending under the arms of the wearer.

3. In a device of the character described adapted to be worn upon the back of a person, a body member comprising leaf springs with their ends disposed at points opposite the waist line and seat of the trousers, non-bendable extensions rigidly secured to the ends of the springs, means for securing one of the extensions to one leg of the wearer adjacent the knee, a cross piece on the other extension and adapted to lie upon the back of the wearer adjacent the shoulder blades, a breast plate adapted to engage the breast of the wearer and means of connection between the cross piece and breast plate extending under the arms of the wearer, and straps connecting the breast plate and cross piece and extending over the shoulders of the wearer.

4. In a device of the character described a resilient body member adapted to be worn upon the back and to be flexed in the bending or stooping of a person wearing the device, means for connecting the upper end of the body member with the body of the wearer adjacent the shoulders and means for attaching the lower end of the body member with one leg of the wearer and a head rest

connected with the body member and disposed to engage the forehead of the wearer.

5. In a device of the character described, a normally substantially straight body member comprising a resilient intermediate portion, rigid extensions secured to the extremities of the resilient portion, the free end of said extremities being adapted to lie adjacent the back of the shoulders and backs of the knees of the wearer of the device and means for connecting the said free ends with the body of the wearer adjacent the knees and shoulders, and a curved head band connected with the uppermost extension and disposed to engage the forehead of the wearer.

6. In a device of the character described a resilient body member adapted to be worn upon the back and to be flexed in the bending or stooping of a person wearing the device, means for connecting the upper end of the body member with the body of the wearer adjacent the shoulders and means for attaching the lower end of the body member with one leg of the wearer, a hinge for said body member intermediate the ends thereof and means for locking the body member against movement on its hinge.

7. In a device of the character described, a normally substantially straight body member comprising a resilient intermediate portion, rigid extensions secured to the extremities of the resilient portion, the free end of said extremities being adapted to lie adjacent the back of the shoulders and backs of the knees of the wearer of the device and means for connecting the said free ends with the body of the wearer adjacent the knees and shoulders, a hinge for said resilient portion intermediate the ends thereof, and a member locking said hinge against operation and unlocking said hinge.

8. In a device of the character described the combination with an implement or tool adapted to be held by the wearer of the device of a resilient body member adapted to be worn on the back and to flex when the wearer stoops or bends over, means for securing the ends of the body member to the body of the wearer, the shoulders and knees, respectively, and a flexible element secured to the means for securing the body member to the upper portion and to said implement or tool.

9. In a device of the character described, an elongated, resilient bendable body portion adapted to be worn upon the back with its extremities adjacent the waist line and seat of the trousers of the wearer and to be flexed when the wearer stoops or bends over, elongated extensions rigidly secured to the free ends of said body portion and means for securing said extensions to the upper part of the body of the wearer and to one leg of the wearer.

10. In a device of the character described, an elongated resilient bendable body portion adapted to be worn upon the back with its extremities adjacent the waist line and seat of the trousers of the wearer and to be flexed when the wearer stoops or bends over, elongated extensions rigidly secured to the free ends of said body portion, means for securing said extensions to the upper part of the body of the wearer and to one leg of the wearer, said body portion being in two parts hingedly connected with one another and means for locking said parts against hinging movements.

ERNEST S. WILLIAMSON.