(No Model.)

J. W. BEACH.

SPRING HEEL.

No. 458,010. Patented Aug. 18, 1891.

Fig. 1.

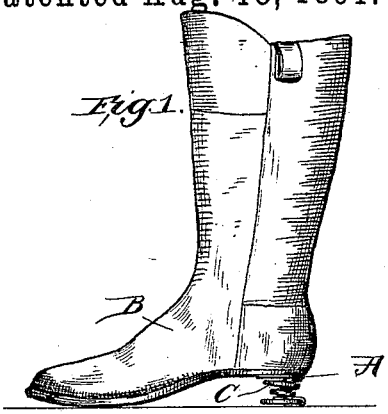


Fig. 3.

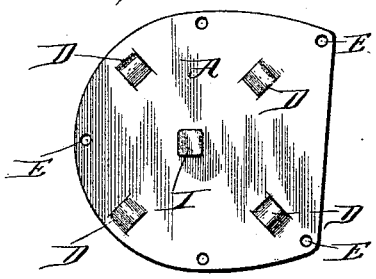


Fig. 5

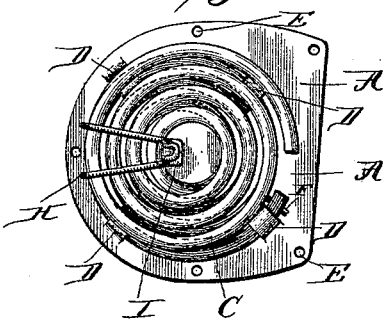


Fig. 4

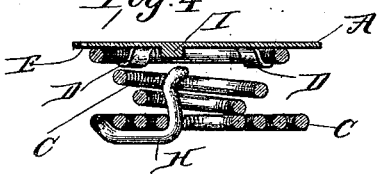
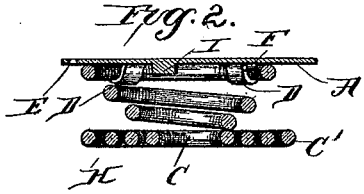


Fig. 2.



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UNITED STATES PATENT OFFICE.

JAMES W. BEACH, OF FERNWOOD, ILLINOIS.

SPRING-HEEL.

SPECIFICATION forming part of Letters Patent No. 458,010, dated August 18, 1891.

Application filed August 23, 1890. Serial No. 362,878. (No model.)

To all whom it may concern:

Be it known that I, JAMES W. BEACH, a citizen of the United States, residing at Fernwood, in the county of Cook and State of Illinois, have invented a new and useful foot-gear or elastic-spring heel and bottom or tread and fastening for said spring and automatic support or device for controlling the rigidity of said spring-heel, of which the following is a specification.

My invention relates to improvements in foot-wear or foot-gear; and the objects of my improvement are, first, to provide for boots, shoes, and sandals elastic springs to receive and automatically exert or impart in walking the power, energy, or living force wasted or lost in each step taken by the person wearing boots, shoes, or sandals as heretofore made and worn; second, to provide springs for boot or shoe heels which will prevent violent concussion between said heels or the bottom of said boots or shoes and the floor, ground, or other places walked upon, and, third, to take advantage of and utilize the percussion (or blow given by the foot) between the foot and the ground or other place walked upon incidental to the ordinary use of the foot as in walking, and to make use in walking of the mechanical advantage to be derived from the recoil or rebound of the elastic spring, compressed by the said percussion and momentum of the body as the weight of the body is first thrown upon one foot and then upon the other, thus rendering walking a matter of ease, as well as delight, and relieving the muscles from much of the strain and the body from the constant jar incident to "pounding the heels" in walking, as is done when the ordinary boot or shoe is worn. I attain these objects by the means or mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a vertical view of the entire apparatus or machine annexed to the boot. Fig. 2 is the elastic spring with heel piece or fastening. Fig. 3 is a heel-piece plate or fastening with clasps or raised loops or loops to receive and hold the spiral spring, also raised projection to aid in automatically preserving the rigidity of said spring during standing, as hereinafter mentioned. Fig. 4 is an elastic spring with upward projection, which projection is for the purpose of aiding in automatically preserving the rigidity of said spring, while standing, by impinging or resting upon the heel-plate or the raised projection of said heel-plate, as hereinafter mentioned. Fig. 5 is a plan view of the elastic heel spring and plate and automatic device for controlling the rigidity and collapsing of said spring.

Similar letters refer to similar parts throughout the several views.

A is the heel-plate, which, with its clasps, loops, catches, and guards D D, forms the seat or fastening of the elastic spring C.

B is the boot or shoe with the heel-plate and elastic springs in place.

C is the elastic heel-spring with key-hole indentation or bend.

E E are screw-holes in plate A.

F is hole, bend, or indentation, all of which I hold to be equivalent; but I prefer to use an indentation in spring C.

H is a projection or an end of said spring C, projecting upward from the base or tread thereof toward said heel-plate for the purpose of (in connection with said heel-plate A) preserving the rigidity of said spring C when the person wearing said spring boots or shoes is standing or at rest, and automatically releasing said spring from said rigidity upon advancing the foot in walking.

I is a projection, bench, or protuberance upon the bottom of said heel-plate, upon or near which said projection H rests when said spring is not compressed.

The manner of constructing the device and apparatus may be briefly described as follows—that is to say, a boot or shoe is made without raised heel, as heretofore made and worn. Then a thin metal plate A, having a diameter about the same as an ordinary boot-heel, is made. This plate is perforated to receive screws or nails E E for the purpose of fastening said plate to the place on the bottom of said boot or shoe usually occupied by a heel, and is furnished with several clasps, catches, or loops D D, which loops may be arranged in nearly a circle, and may be made by cutting and raising portions of said plate at the points on said metal plate where it is desired to have said loops. The loops or catches thus made are raised or pressed so

as to project beyond the surface of the bottom (when in place) of said plate far enough to receive part of the first or top coil of the spring C within said loops or catches. Said fastenings may also be made in the form of a clasp cut from said metal plate, bent over and fashioned so as to firmly clasp said spring when in place and fastened with a screw or rivet. A slight protuberance, bench, or elevation I may be raised or made to project downward (when in place) from the bottom of said heel-plate A at a point near or back of the center of said heel-plate. This projection may be in length about one-half inch, in width about one-quarter of an inch, and in height or depth about three-eighths of an inch or longer and made so as to readily and automatically press upon and support and automatically disengage from the holding and support of the end or projection H of said spring when said spring is in place and use. An elastic spring C is then made, which may be in the form of a conical spiral spring or double cone with the bottom thereof bent in upon itself, so as to have one or more coils in the same plane and substantially parallel to the greater part of the top coil of said spring C. The rear portion of the bottom or tread of said spring C is furnished, in connection with said heel-plate, (and when desired,) with a device for preserving the rigidity of said spring when not compressed—that is to say, the said rear portion of said tread is securely connected with or fastened to a small suitable piece of metal H, projecting up into or from the tread of said spring at such point and for such distance that the upper end thereof will loosely rest upon the lower end of said protuberance, bench, or projection I, and near the front side or edge thereof when said spring is not compressed. This metal projection upon said spring C may also be made of or by a suitable bending inward and upward of the end of a portion of the wire of which said spring is made. The upper end of said projection H should be bent slightly forward and in such manner as to present some surface for contact with said heel-plate when the projection I is not used, and in such form as to allow most readily the automatic disengagement of said projection H with said projection, bench, or seat I (and heel-plate when said projection I is not used) upon compressing the rear portion of said spring C, as in walking. Said plate A is then screwed or otherwise fastened to the bottom of said boot or shoe at the place usually occupied by the boot or shoe heel, and thereupon a part of the top or upper coil of said spiral spring is inserted in said clasps or loops so raised, as aforesaid, and there securely fastened, which fastening may be accomplished by inserting a screw or nail at the point F, called a "keyhole" or "indentation." This keying or fastening may also be accomplished by a suitable bend in said spring, allowing the same to interlock between clasps or raised points or catches on said plate. In this manner said spring can be readily inserted and firmly held or removed and replaced. Said elastic spring may also be fastened to the boot or shoe in a variety of ways and without the intervention or use of said plate. Said heel-spring can also be used without said projections H and by using said projection I, in which case said projection I is made of such length as to allow the lower end thereof to automatically engage with and disengage from (while in use) contact with the tread of said spring C.

The manner of using said invention consists in wearing said boots or shoes having said elastic spring C in the same manner as boots or shoes are ordinarily worn. In using said invention it will be found that in throwing the foot forward, as in walking, the percussion or impact which is usually wasted upon a hard unyielding boot-heel will cause said elastic spring C to become compressed, and the rebound or recoil of said elastic spring C will strongly tend to lift the heel of the foot, and therewith the leg and body, which at the time of said rebound or recoil will be found to be or to have been advanced, balanced, or impelled forward to a position nearly perpendicularly above or over said foot. The other foot at this moment will have a tendency to swing forward without exertion. When said automatic device or said projections H and I are used, or said projection I alone is used, to preserve or control the rigidity of said spring C when not compressed, the action is as follows: When the foot is advanced, as in walking, the rear portion of the bottom of the heel of said spring C will first be compressed. This will cause said projection H to advance forward and to become disengaged from contact with said projection or bench I. Upon the foot being further advanced the whole of said spring C receives the weight of the body, and thereby said spring becomes compressed perpendicularly. Upon raising the heel said spring C recoils or rebounds to its former position, and thereby said projection H is made to resume its former position, with one end resting upon said heel-plate A or upon said bench or projection I—a position it will retain when the person using the same is standing at rest upon a substantially level surface.

It is found that by the use of this invention the act of walking is relieved of nearly all the jar now incident thereto, and that the percussion, impact, waste energy, or force incident to walking with the ordinary shoe or boot heretofore in use is by this invention utilized and turned into motive power of no small proportions.

It will be found a matter of ease as well as pleasure to walk with boots or shoes equipped with this invention.

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

1. The combination of the boot or shoe B,

the heel-plate A, with raised projection or bench I, the screw-holes E E, and loops or clasps D D, with the elastic spring C, having coils or convolutions upon the lower end or tread of said spring, and the projection or bent end H of said spring.

2. The combination of the boot or shoe B, the heel-plate or fastening A, with the loops or clasps D D, having the screw-holes E E, with the elastic spring C, having the notch or indentation F, and the projection or bent end H of said spring.

3. The combination of the spring C, provided with the projection H, with the heel-plate A, provided with the loops or clasps D D, the screw-holes E E, and the projection I.

JAMES W. BEACH.

Witnesses:
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WM. H. SCOTT.