(No Model.) 4 Sheets—Sheet 1.

E. A. MUNGER.

ELASTIC OR SPRING HEEL.

No. 380,508. Patented Apr. 3, 1888.

Fig. 1.

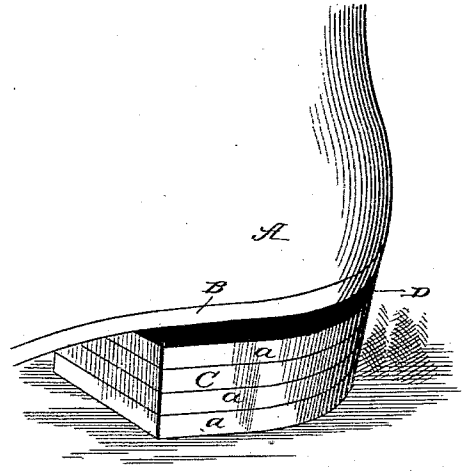


Fig. 2.

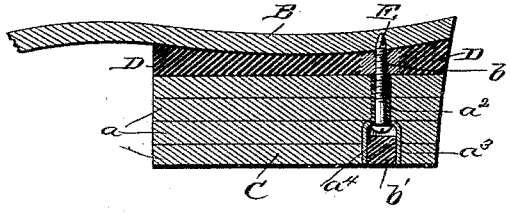


Fig. 3.

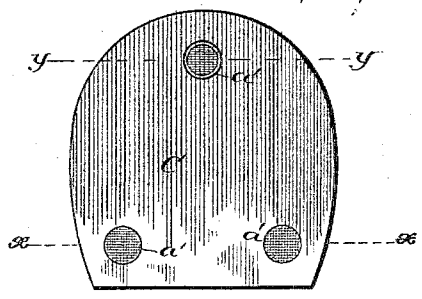


Fig. 4.

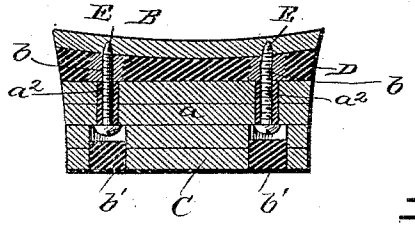


Fig. 5.

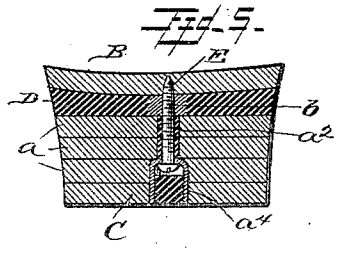
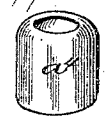


Fig. 6.



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E. A. MUNGER.

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No. 380,508. Patented Apr. 3, 1888.

Fig. 7.

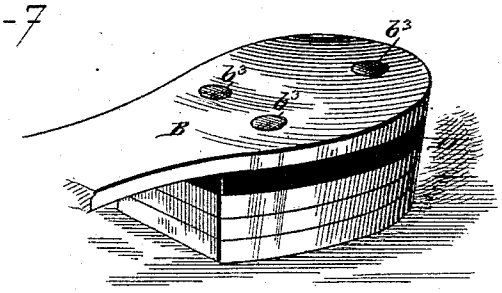


Fig. 8.

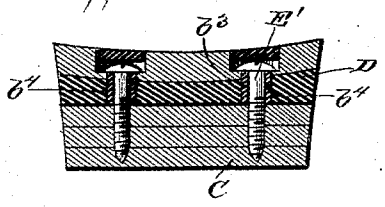


Fig. 9.

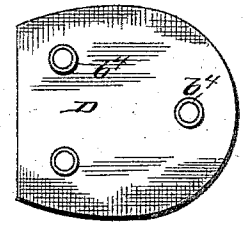


Fig. 10.

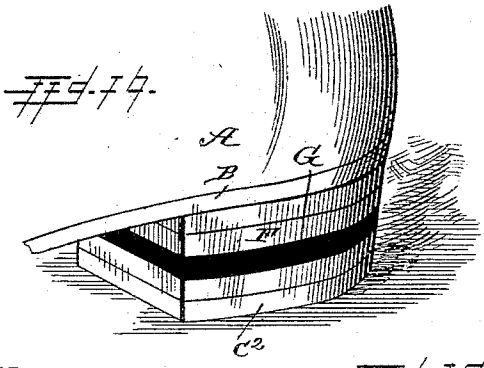


Fig. 11.

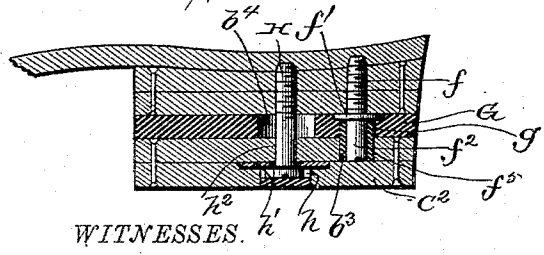
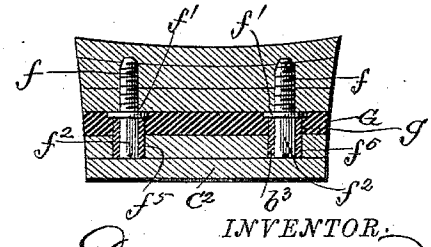


Fig. 12.



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E. A. MUNGER.

ELASTIC OR SPRING HEEL.

No. 380,508. Patented Apr. 3, 1888.

Fig. 13.

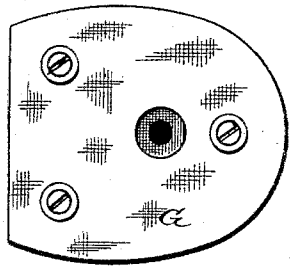


Fig. 14.

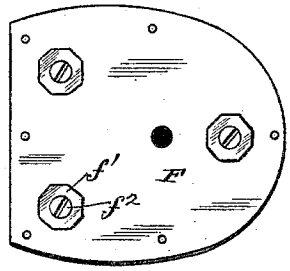


Fig. 15.

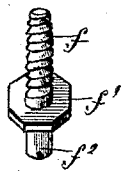


Fig. 16.

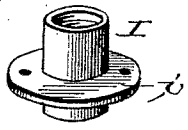


Fig. 17.

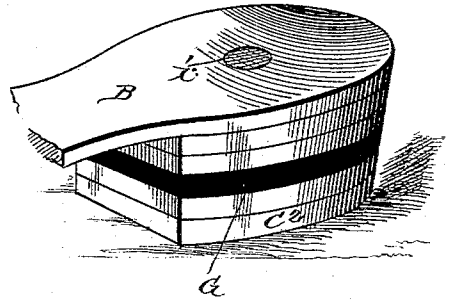


Fig. 18.

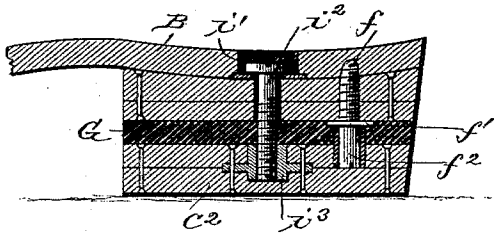
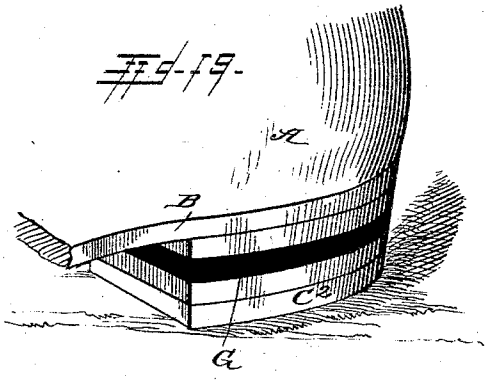


Fig. 19.



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E. A. MUNGER.

ELASTIC OR SPRING HEEL.

No. 380,508. Patented Apr. 3, 1888.

Fig. 20.

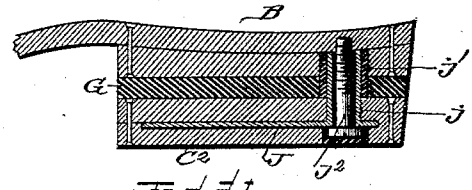


Fig. 21.

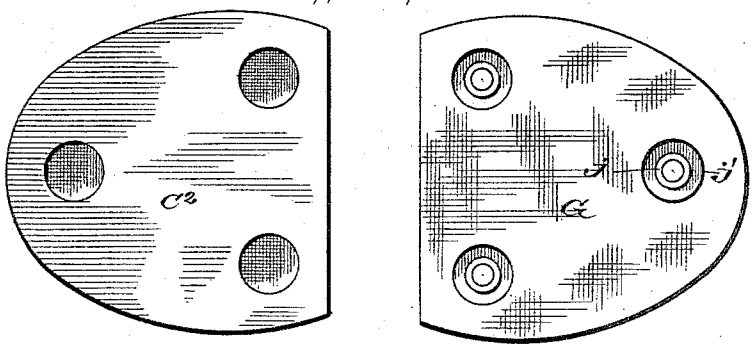


Fig. 22.

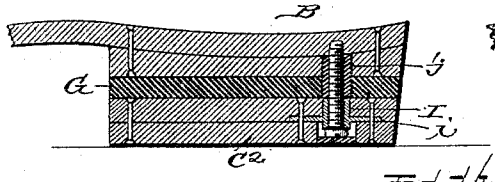


Fig. 23.

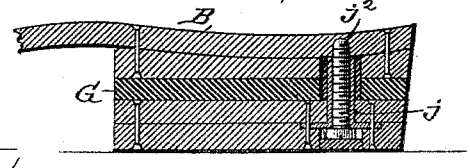


Fig. 24.

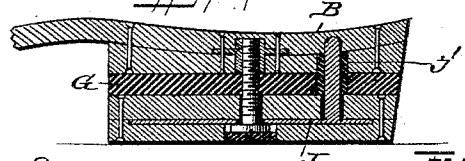


Fig. 25.

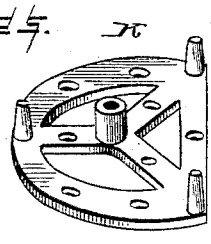
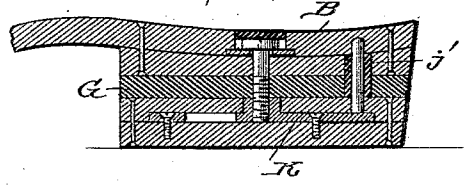


Fig. 26.



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UNITED STATES PATENT OFFICE.

ERNEST A. MUNGER, OF BEAVER DAM, WISCONSIN, ASSIGNOR TO GEORGE E. SWAN, OF SAME PLACE.

ELASTIC OR SPRING HEEL.

SPECIFICATION forming part of Letters Patent No. 380,508, dated April 3, 1888.

Application filed January 20, 1888. Serial No. 261,403. (No model.)

To all whom it may concern:

Be it known that I, ERNEST A. MUNGER, a citizen of the United States, residing at Beaver Dam, in the county of Dodge and State of Wisconsin, have invented certain new and useful Improvements in Elastic or Spring Heels; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

This invention pertains to certain new and useful improvements in elastic or spring heels for producing a forward and vertical spring movement in walking, thereby obviating the jar usually experienced in walking upon hard or unyielding surfaces or pavements, the principle of the invention being preferably effected by reason of the novel arrangement and disposition of the holding-screws, which retain the bottom section of the heel in position in connection with the base of the heel or sole of the shoe.

A further object of the invention is the production of a device which will possess advantages in point of simplicity, durability, and inexpensiveness, ease of application, and general efficiency.

In the accompanying drawings, Figure 1 is a perspective view of the heel and rear portion of a shoe provided with my invention. Fig. 2 is a vertical longitudinal sectional view of the same. Fig. 3 is a bottom plan view of the bottom section. Figs. 4 and 5 are cross-sectional views taken on the lines *x x* and *y y*, respectively, Fig. 3. Fig. 6 is a detailed perspective view of the cup-shaped washer. Fig. 7 is a perspective view showing the bottom section secured by the screws passed through holes in the sole. Fig. 8 is a vertical sectional view taken through two of the holes or apertures. Fig. 9 is a bottom plan view of the cushion with the bottom section removed. Fig. 10 is a view in perspective showing the cushion interposed between the base and bottom section of the heel. Fig. 11 is a vertical longitudinal sectional view thereof. Fig. 12 is a cross-sectional view taken through the two front short posts or studs. Fig. 13 is a bottom plan view of the cushion with the bottom section removed. Fig. 14 is a plan view of the bottom section. Fig. 15 is a detail perspective view of one of the posts or studs. Fig. 16 is a detail perspective view of a cupped washer provided with a securing-flange. Fig. 17 is a perspective view showing the bottom section secured by a screw passed through a hole in the sole. Fig. 18 is a vertical longitudinal sectional view thereof. Fig. 19 is also a perspective view showing the cushion between the base and bottom section of the heel. Fig. 20 is a longitudinal sectional view thereof. Fig. 21 is a diagram showing lower face of base and top of cushion. Figs. 22, 23, 24 are views similar to Fig. 20, showing modified forms of tubes. Fig. 25 is a view showing a skeleton plate having short posts or studs, and Fig. 26 is a longitudinal sectional view showing the same in position.

Corresponding parts in the figures are denoted by the same letters of reference.

Referring to the drawings, A designates the heel or counter of a boot or shoe, and B the lower sole-piece thereof extending below the same.

C is the retaining or bottom section of the heel, composed of two or more layers of leather, *a*, through which are formed, preferably, three holes or apertures, *a'*, one being provided at or near each front corner of the bottom section of the heel and one at about the center of the rear or curved portion thereof. These holes or apertures *a'* are provided with rubber bushings a^2, extending from a point about midway the thickness of the bottom section to the upper surface thereof, thus making the upper portions, a^2, of said holes or apertures smaller in diameter than the lower portions, a^3, as shown. Within the lower portions, a^3, of these holes or apertures may be secured cup-shaped washers a^4, which extend to the lower surface of the bottom section, as shown in the rear central hole or aperture of said top lift in Fig. 3, and in detail, Fig. 6; or, in lieu of said cup-shaped washers, small flat washers may be employed; or the washers can be entirely dispensed with, if desired.

D is a cushion, which may be constructed of rubber or any other suitable but durable yielding material sufficiently hardened to meet the demand. This cushion is disposed in the present instance between the lower surface of the

sole and the top surface of the bottom section, as shown, said cushion being of the same formation or having the general outline of said bottom section and the heel end of the sole. This cushion is also provided with holes or apertures *b*, occupying the same relative position as those of the bottom section. The cushion D being placed in proper position and the bottom section, C, also placed in proper position against the same, so as to cause their respective holes or apertures to be coincident, the same are retained in assembled position by means of screws E, having each a head of greater diameter than the bushing a^2 in the upper portion of the bottom section, C, but of less diameter than the lower portion, a^3, of said holes or apertures in said bottom section, or when a washer is employed, as above indicated, smaller than the bore thereof but larger than the contracted opening. These screws are screwed through the holes or apertures of the bottom section and cushion into the sole B, and the shouldered heads of said screws are forced to the full extent of their movement. After this the holes or openings in the lower portion of the bottom section, C, are provided with a rubber or other suitable filling, *b'*, as shown. It will thus be seen that the screws for retaining the cushion and bottom section are rigid in the sole and loose in the heel, and that the holes in the bottom section and cushion are bushed with rubber. By means of this arrangement I obtain the desired vertical and forward spring, the latter being effected by reason of securing the screws in the manner stated.

If desired, the bushing in the holes or apertures both in the bottom section and cushion may be dispensed with and the same purpose accomplished by passing the retaining-screws through closely-fitting holes or apertures, and a sufficient spring will thereby be obtained by reason of the fact that the screw will give to a limited extent in the leather.

In the above-described form of carrying out the objective features of my invention I have shown the retaining-screws to be rigid in the sole and loose in the bottom section; but the same result can likewise be obtained by reversing the above and making the screws rigid in the bottom section of the heel and loose in the sole. When this last-referred-to form is observed, I make three (more or less) holes or apertures, b^3, in the sole B, and provide the same preferably with rubber bushing b^4, projecting beneath said sole and extending through correspondingly-formed holes or apertures in the cushion D, said bushing b^4 serving the same purpose as the bushing a^2 in the holes or apertures *a'*, as above described.

In this form of my invention the retaining-screws E' are passed downwardly through the bushing in the holes or apertures b^3, and the ends thereof are designed to be rigidly secured within the bottom section, C, of the heel, and the heads of said screws are designed to rest against the upper ends of said bushing and within the holes or apertures, which are in this instance likewise larger than the heads of said screws. If desired, the cup-shaped or flat washers before described can be also used in this instance, and the holes or apertures b^3 are likewise provided with suitable fitting disks or filling.

It will be noted that in this form of my invention I also obtain the forward spring movement by rigidly securing the lower ends of the retaining-screws in the bottom section and loosely securing the upper ends in the holes or apertures of the sole. In this arrangement, if desired, the rubber bushing can likewise be dispensed with and the retaining-screws passed through close-fitting holes or apertures in the leather, as before intimated.

These above-described forms of carrying into effect the principles of my invention are designed more especially for low heels, and in obtaining the desired results metallic plates of all descriptions are dispensed with and a device is obtained that is very simple in construction, and, being composed of but few parts, the cost of production is reduced to a minimum.

The preferred form of application of my invention to a high-heel shoe is shown in Fig. 10, and consists, chiefly, in the application of the cushion between two sections or halves of the heel—*i. e.*, between the base of the heel and the bottom section thereof.

The base F of the heel is secured in position against the bottom of the sole by means of three (more or less) screws, *f*, passed upwardly through holes or apertures in said base and entering said sole, thus rigidly securing these parts together. These screws have flanged heads *f'*, which bear against the lower surface of the base of the heel, and from these flanged heads project short posts or studs f^2, as shown. The short posts or studs are provided with rubber bushing b^3, which tightly surrounds the same.

G is a cushion provided with three (more or less) holes or apertures, *g*, through which are designed to project the bushing-covered short posts or studs f^2, and said cushion is also provided with a central hole or aperture, b^4, coincident with the central smaller hole or aperture of the base of the heel.

The upper surface of the bottom section, C, is provided with three (more or less) recesses, f^5, wherein are designed to project the bushing-covered posts or studs f^2, whereby the cushion and bottom section are prevented from turning by the intermeshing posts or studs and the apertures f^5.

The bottom section is securely held in position by means of a common wood-screw, H, which is projected through a hole or aperture in a metallic plate, *h'*, interposed between the two layers of leather comprising the bottom section, and through a hole or aperture, h^2, in the inner portion of said bottom section, said

screw being passed also through a central aperture of the cushion and rigidly held in the base of the heel and partly in the sole. The hole or aperture *h* in the bottom section and metallic plate are of greater diameter than the remaining holes or apertures through which the retaining-screw is passed, whereby the head of said screw is allowed room for play within the bottom section. Said hole or aperture *h* is also provided with a suitable filling, as shown.

In lieu of the metallic plate *h'*, I can employ a cupped washer, I, provided with a horizontal flange, *i*, as shown in Fig. 16, which is designed to take the place of said metallic plate, said flange being likewise interposed between the two layers of leather composing the bottom section, and is held in position by means of two or more nails passing through holes or apertures in said flange. The cupped washer is preferably extended forward through said flange a short distance, so as to permit the screw-head to occupy a point far from the surface of the bottom section, which is a desideratum.

In lieu of securing the bottom section in the manner just described, I provide an invisible fastening for securing said bottom section from the inside of the shoe, as shown in Fig. 17, so as to make the securing-screw rigid in the bottom section and loose in the sole, the reverse of the means last above described. This is accomplished by forming a central aperture, *i'*, in the sole of the shoe, wherein the washer is disposed, and through this hole or aperture *i'* and a coincident hole or aperture in the washer is passed an ordinary machine-screw, i^2, which is passed through the loose-fitting aperture in the base of the heel, and is rigidly secured at its lower end in a metallic nut, i^3, interposed between the layers of the bottom section, occupying the same place as the cupped washer described in the last form, said nut being also provided with a flange through which are passed suitable securing-nails for holding said nut in position. The hole or aperture *i'* in the sole is also in this instance larger in diameter than the head of the retaining-screw, so as to permit, as in the former instance, said head or screw to have play within the said aperture in the sole. This latter form of arrangement is designed more especially for high heels, so that when the heel becomes worn only a portion thereof—the outer layer of the bottom section—need be renewed.

From the foregoing description of this form of application of the principle of my invention it will be seen that the elastic cushion is disposed between the base and bottom section of the heel, and that in walking the forward spring is obtained by the elastic covered posts or studs intermeshing with the recesses in the bottom section, and that by reason of the described disposition of the retaining-screw the same is relieved and the studs surrounded by the tubular bushing take all strain and shock, and thus, in connection with the elastic cushion, the heel is cushioned in all directions.

If desired, the principle embraced by the form last above described may be likewise carried into effect by interposing the elastic cushion between the base and bottom section of the heel and securing the same in position by means of tubular extensions *j*, projecting upwardly from a metallic plate interposed between the layers of the bottom section, said extensions being also provided with rubber bushing, and these bushing-covered extensions *j* are designed to project through corresponding apertures in said cushion and intermesh with recesses *j'* in the base of heel, and through these tubular extensions are passed retaining-screws j^2, extending through the base and held rigidly at their upper ends in the sole of the shoe. In lieu of the tubular extensions *j*, the cup-shaped washer hereinbefore described can be used in lieu thereof, and project downwardly through the bottom section and form a washer for the screw-heads; or in lieu of the metallic plate J said tubular extensions can each be provided with a flange through which nails will be passed for securing them in position; or, if desired, the extensions *j* can be made solid and project upward from the metallic plate J and be surrounded with rubber bushing, and likewise intermesh with the recess in the base of the heel to prevent the bottom section from turning, and when this form is used the bottom section is rigidly secured in position by an ordinary wood-screw passed either through the aperture or hole in the sole and rigid at its lower end in the bottom section, or passed through a hole or aperture in the bottom section and rigid in the sole, as last above described.

In this form of my invention I can also employ to equal advantage the metallic plate K shown in Fig. 25, which plate can be secured between the layers composing the bottom section and having its posts or studs projecting upwardly through the cushion and intermeshing with the recesses in the base, said plate having a central apertured post, into which a retaining-screw is passed from a hole in the sole, the manner of securing and the arrangement of this metallic plate being fully set forth and claimed in my application for Letters Patent filed October 4, 1887, Serial No. 251,449.

From the foregoing description it will be seen that I provide various means for carrying into effect the principles of the vertical and forward spring of the heel in walking, and that when the heel is compressed or stepped upon the retaining screw or screws of the respective forms of application are relieved and the studs or posts surrounded by the rubber bushing consequently take all the shock of the forward spring and the elastic cushion that of the vertical spring.

It will also be seen that this is accomplished

by securing the heel by screws which are either rigid in the sole and loose in the heel, or, vice versa, rigid in the heel and loose in the sole.

A heel embodying the principles of my invention possesses many advantages from those now in use, and by reason of its elasticity will not be liable to wear as rapidly by friction, and will thus last much longer. At the same time it greatly facilitates the wearer in walking, by reason of its forward spring, and prevents irritation of the heel of the foot and shock caused by walking on hard or uneven pavements.

I claim as my invention—

1. An improved spring-heel composed of sections, rubber bushing in the holes or apertures through which the retaining-screws are passed for securing the bottom section, and the cushion, as and for the purpose stated.

2. The bottom section of the heel, having apertures provided with elastic bushing, the cushion, and the retaining-screws passed through said bushing, whereby the forward spring is produced in walking, as stated.

3. As an improvement in spring-heels, the holes or apertures for the retaining screws, provided with the rubber bushing, and the cup-shaped washers disposed in said apertures and having holes or apertures through which the retaining-screws are passed, as shown and described.

4. The herein-described spring-heel, the same comprising the elastic cushion, the bottom section, the holes or apertures, the rubber bushing, and the retaining-screws passed through said bushing and having their heads in holes or apertures of greater diameter than said heads, substantially as shown and described.

5. The combination, with the sole and the elastic cushion, of the apertures therethrough, having the rubber bushing secured therein, and the retaining-screws, substantially as shown and described.

6. The combination, with the sole, the bottom section, and the cushion, of the elastic bushing secured in apertures and extending through corresponding apertures in said cushion, and the retaining-screws, substantially as shown and described.

7. The combination, with the sole, of the bottom section, the tubular extensions, the elastic cushion, and the retaining-screws, substantially as shown and described.

8. The herein-described improvement in spring-heels having means for producing the vertical and forward spring movement, consisting in providing the holes or apertures in the lower portion of said heel for the retaining-screws with rubber bushing and the elastic cushion, substantially as shown and described.

9. As an improvement in spring-heels of the class herein described, the heel comprising the bottom section and base and the posts or retaining-screws for securing said bottom section and base together, said posts or screws being rigid in one portion or section of said heel and passing loosely through openings in the other portion or section, and having play in said openings, whereby one portion or section has a forward and vertical movement with relation to the other portion or section and a forward spring movement is obtained in walking, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

ERNEST A. MUNGER.

Witnesses:
J. E. HOSMER,
J. MARTIN.