(No Model.) 2 Sheets—Sheet 1.

E. S. RICHARDS.

PEDAL FOR BICYCLES.

No. 583,086. Patented May 25, 1897.

Fig. 1

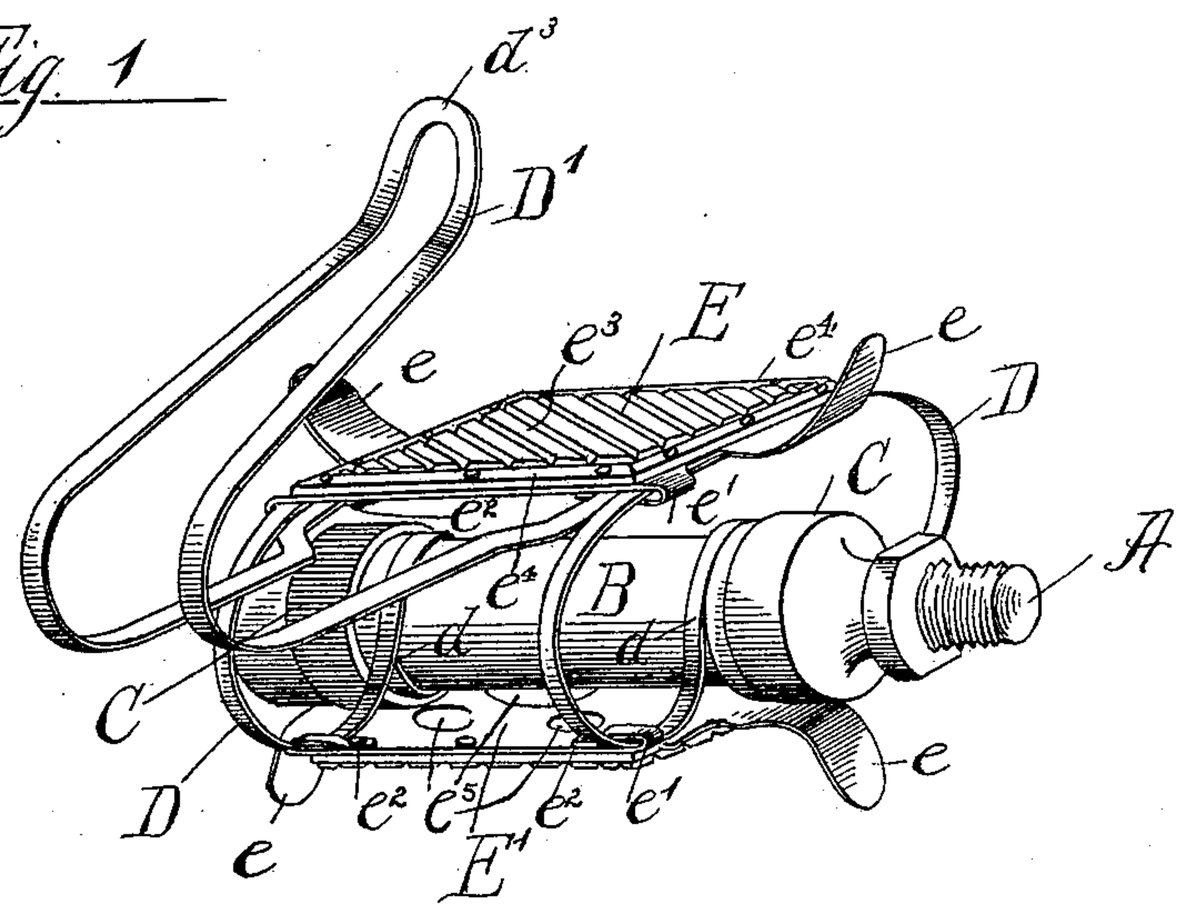
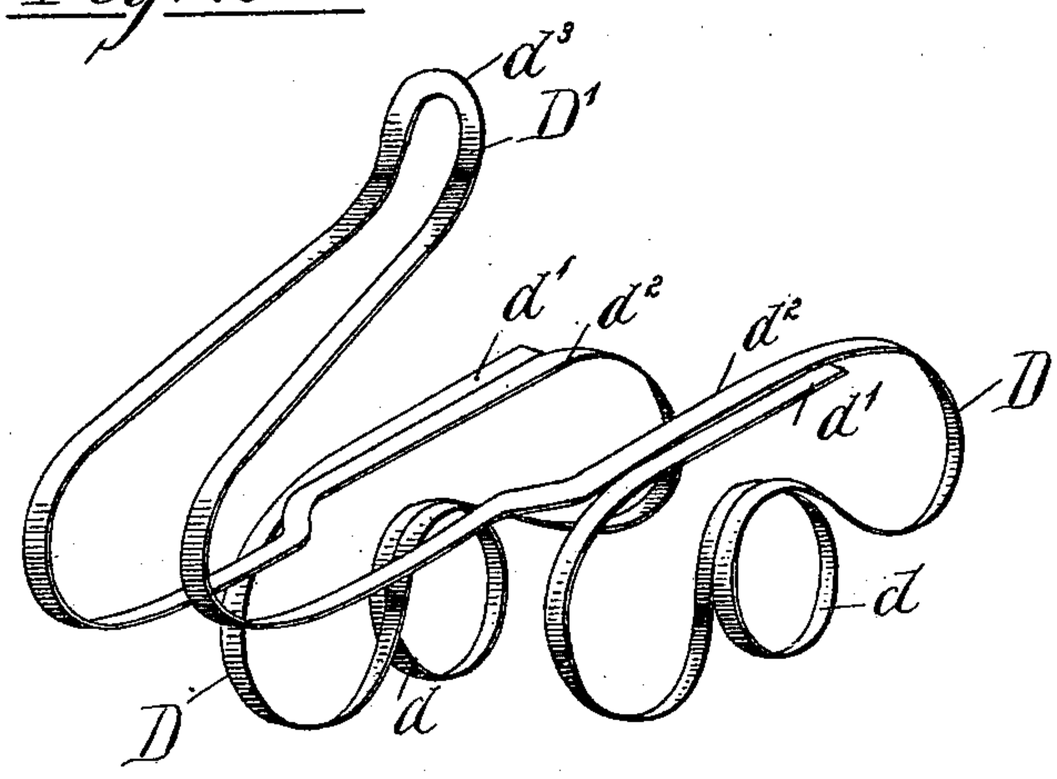


Fig. 2



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(No Model.) 2 Sheets—Sheet 2.

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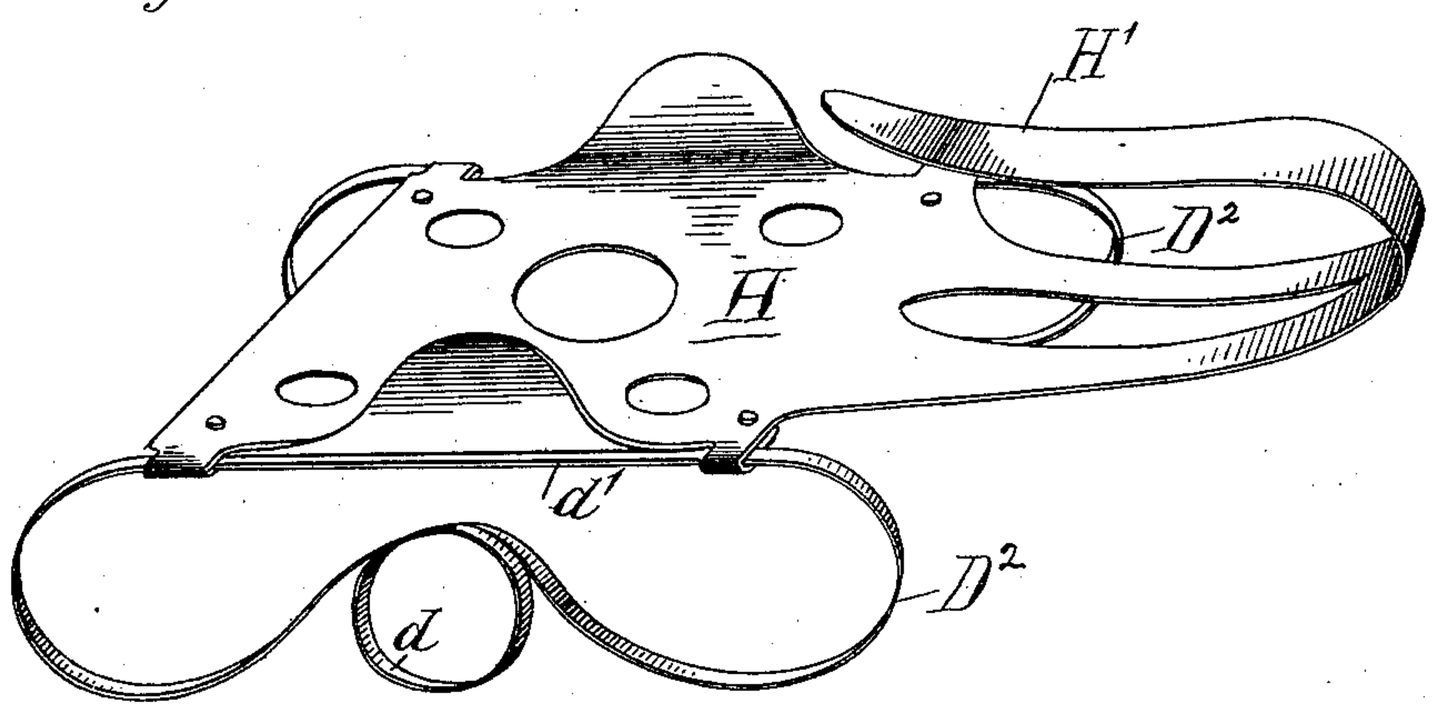
Fig. 3



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UNITED STATES PATENT OFFICE.

EDWARD S. RICHARDS, OF CHICAGO, ILLINOIS.

PEDAL FOR BICYCLES.

SPECIFICATION forming part of Letters Patent No. 583,086, dated May 25, 1897.

Application filed February 6, 1896. Serial No. 578,184. (No model.)

To all whom it may concern:

Be it known that I, EDWARD S. RICHARDS, a citizen of the United States, residing in Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Pedals for Bicycles and the Like, of which the following is a specification.

A marked element of fatigue in bicycle-riding has its source in the vibrations which are transmitted through the pedals to the person of the rider by reason of the rigidity that exists in the frame and driving connections of the machine as usually constructed. Such vibrations benumb and tire the muscles by administering a continuous series of shocks or tremulous blows upon the legs when working the pedals and tend to produce exhaustion and consequent loss of power, the effect being practically the same upon the muscular and nervous systems as the action of a galvanic battery. To overcome this defect, I interpose springs between the shaft and foot-tread of the pedal in such manner that the springs are compressed by the force or power applied to the descending pedal in the downward or impelling stroke and afterward react to lift the leg with an elastic movement in passing the dead-centers and on the upward stroke. I further propose to apply these springs in such manner that they may yield horizontally as well as vertically, so as to take up the thrust of the foot and cure all mechanical vibration that is calculated to wrench or rack the mechanism of the machine, and, still further, I combine with the spring-supports of the pedal a toe-clip, whereby the foot is held in proper relation thereto, and by means of which the rider is given better control of his pedal, all as hereinafter described, and set forth in the claims.

In the drawings, Figure 1 is a perspective view of a bicycle-pedal embodying my invention in one form. Fig. 2 is a detail view showing the integral construction of the toe-clip and spring used thereon. Fig. 3 illustrates an alternate form or modification of the pedal.

In said drawings, Fig. 1, A designates a pedal-shaft which is embraced by a sleeve B, having chambers C adjacent to its ends for the reception of ball-bearings. Said shaft and bearings in themselves constitute no portion of my present improvements and may be of any usual or preferred construction desired. Around the sleeve B, adjacent to and inside of the annular shoulders afforded by the ball-chambers, are coiled springs D. The coils *d* of said springs terminate at what may be assumed for the purpose of this description to be the crown of the sleeve, and from thence each pair is bent downward and outward on either side of the sleeve to a level with the bottom thereof. They are then turned outward and upward, and finally inward, to form horizontal bridging reaches d' d^2, which extend oppositely past each other some considerable distance above the sleeve (say approximately one-half an inch) and constitute the spring-support for the yielding tread E.

In the approved construction shown in Fig. 1 the pedal is furthermore provided with a toe-clip D′, which is made integral with the spring-bars D. The forward ends of the corresponding horizontal reaches d^2 of each side spring merge into the clip, and the latter is carried thence forward and finally upward and backward in slightly-converging reaches, as shown, to a central point of union d^3. In other words, the clip and spring are formed of a single bar or wire of metal of practically uniform width and thickness, which is bent at its center to form the apex d^3 of the clip, and is then otherwise shaped in accordance with the outline above detailed.

When the toe-clip is made separate from the springs or is omitted entirely, as will usually be the case with pedals for ladies' use, the horizontal reaches will terminate at the edge of the tread after passing beneath it, and each spring in such case will be made of a separate piece of metal.

The tread E desirably consists of a metal plate struck out integral with side guards *e* and with lateral ears or clips *e′* at its corners. Said ears are turned under to embrace and confine the horizontal reaches of the spring and are secured by rivets e^2, which pass through the ends of the ears and through the plate. These rivets may also serve to confine a rubber pad or friction-surface e^3 upon the tread by passing in addition either through the rubber alone or through the rubber and

the sides of an open-flanged cap or confining-frame e^4, which sets over and embraces the edge of the rubber sheet or pad.

On the opposite side of the pedal-shaft from the spring or yielding tread just described is desirably arranged a similar but rigid tread E′, which is also provided with the side guards e and corner clips or ears e'. The latter are folded over to embrace the curved reaches of the springs at the point where they become flush with the bottom of the sleeve and thus secure the tread in practical contact with the sleeve, so that when turned upward and put in use they rest directly upon the sleeve and afford the usual rigid pedal action. With this construction the rider may, by simply swinging the desired tread uppermost on the pedal-shaft, be provided at will with either a spring or rigid pedal, accordingly as he may at the moment deem the use of the one or the other to be most advantageous. The tread-plates described may be lightened by cutting out circular or other apertures, such as e^5, from the central portions thereof. The remaining metal, however, will be sufficient to sustain the rubber pads e^3 throughout substantially their entire area, and a broad and ample bearing-surface will thus be provided upon which the ball of the foot may rest most comfortably.

In Fig. 3 I have shown a construction in which the tread H is mounted upon separate springs D^2, as in Fig. 1, but has its toe-clip H′ made integral with the tread, as in Fig. 2. The pedal-shaft and sleeve and the lower or rigid tread have been omitted from this view, but are obviously applied in the same manner as hereinbefore stated.

The employment of springs with the pedal of a bicycle as herein described involves no increased muscular exertion. They take up muscular and mechanical vibration or lost motion. They act as reactionary agencies for returning an amount of power necessarily expended in forcing the descending pedal-crank to and beyond its center. This power costs nothing, as the same and no greater power required to work the pedal depresses the spring for this return action in favor of the ascending pedal and relaxed muscles, and these advantages will be attained, although the shape and outline of the springs are varied and their mode of application changed, so long as a suitable amount of play is provided for.

I claim as my invention—

1. The combination, in a pedal, of the pedal-shaft, the sleeve thereon, the springs having coils and outsetting curved reaches and horizontal bridging reaches practically as set forth, and the tread-plate secured to said horizontal reaches.

2. The combination, in a pedal, of the pedal-shaft, the sleeve thereon, the springs having central coils, outsetting curved reaches and overhead bridging insetting reaches, the spring-tread secured to the bridging reaches on one side of the shaft, and the rigid tread secured to the curved reaches on the opposite side thereof.

3. The combination with the pedal-shaft, of the sleeve thereon, springs connected to said sleeve near the ends thereof, each spring, extending thence outward, upward and inward in a curve, with its ends bridging said sleeve and lapping past each other a substantial distance, a pedal-plate mounted upon the bridging reaches, and clips confining the plate to said springs and the lapping reaches to each other.

4. The combination with the pedal-shaft, of the sleeve thereon, the springs coiled thereabout, outsetting in curved reaches on each side thereof and insetting in bridging reaches thereover, two of which latter reaches merge into an integral toe-clip, and the tread-plate attached to the bridging reaches.

5. The combination with the metallic tread-plate, of the springs upon which it is mounted, the clips from said plate embracing said springs, the rubber pad upon the upper surface of said plate, and the rivets serving to unite said pad to the plate and to secure the clips.

6. The pedal-spring consisting of a single strip of metal bent at its center to form the apex of a toe-clip, extending thence first forwardly downward and then horizontally rearward to pass along the pedal-plate and finally terminating in parallel resilient loops for supporting the pedal-plate on the pedal-shaft.

EDWARD S. RICHARDS.

Witnesses:
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