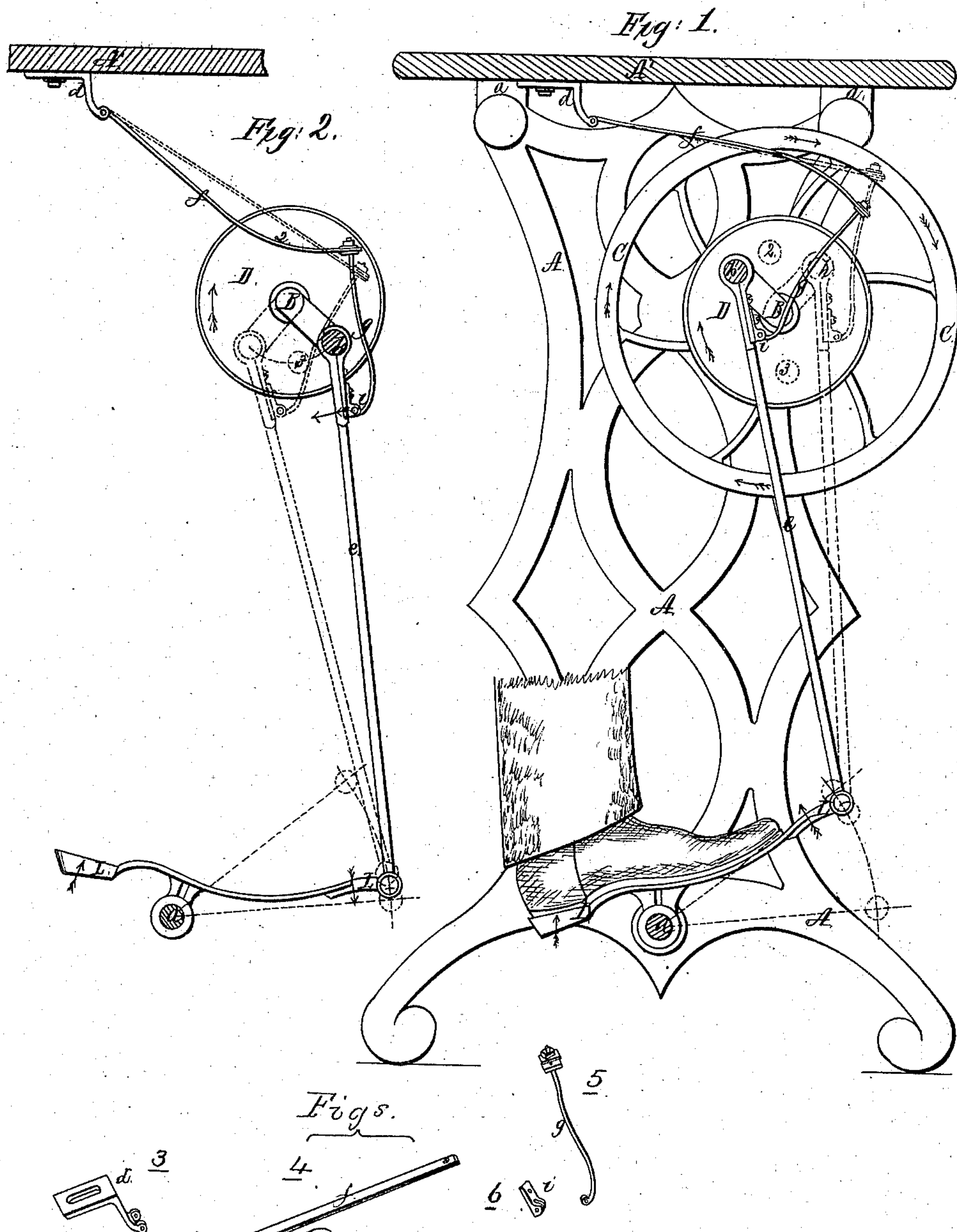


No. 31,926.

PATENTED APR. 2, 1861.

T. WILLIAMS.
MEANS FOR AVOIDING DEAD CENTERS IN CRANKS.



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IMPROVEMENT IN MEANS FOR AVOIDING THE DEAD-CENTERS IN CRANKS.

Specification forming part of Letters Patent No. 31,926, dated April 2, 1861.

To all whom it may concern:

Be it known that I, TURNER WILLIAMS, of Providence, in the county of Providence and State of Rhode Island, have invented a new and useful Improvement in Means for Avoiding the Dead-Centers in Cranks, which is applicable to sewing-machines and others of a similar character when a crank operated by a treadle is employed for driving the same; and I do hereby declare that the following is a full, clear, and exact description of the said improvement, reference being had to the annexed drawings, forming part of this specification, in which—

Figure 1 is a side elevation and section of the frame and working parts of a sewing-machine with my improvement. Fig. 2 is a like view of the working parts detached from the frame and occupying a different relative position from that of Fig. 1. Figs. 3, 4, 5, 6 represent my improvement in detail.

Similar letters of reference denote like parts in all the figures.

My invention consists in arranging a spring with a stiff rod extending at right angles from its loose end in such relative position with respect to a crank to which it is directly connected that the said device shall operate alternately in opposite directions with the revolution of the crank to carry it past both "dead-centers" without stopping, the said force, combined with the action of the treadle, producing very nearly the action of the human hand in turning a crank and an equally regular motion therewith.

To enable those skilled in the art to make and use my invention, I will proceed to describe its construction and operation.

A A' represent the table and frame of a sewing-machine as usually constructed, (the opposite side piece corresponding with A being omitted to give an unobstructed view of the working parts.) The two side pieces are fastened together by means of screws passing through lugs upon the frame at *a a* into the table at the top, and by the rod *a* at the bottom, extending from one side piece to the other and fixed at the ends in each.

B is the crank-shaft, revolving in suitable bearings formed in the side pieces, A. C is the balance-wheel, and D the driving-wheel, upon said shaft.

b is the crank, connected by the rod *e* to the treadle L, which vibrates upon the rod *a*, as shown.

The construction and arrangement of the parts thus far described do not differ in any essential particular from those in general use for the purpose.

f is a straight flat spring, as shown in Fig. 4, which is attached at one end to the stand *d* in a swinging joint beneath the table, as shown in Figs. 1 and 2. A rod, *g*, is attached to the loose end of this spring *f* by means of a washer upon each side of the spring and a nut to set them together, and extends at right angles, or nearly so, therefrom, connecting in a swinging joint with the rod *e*, near the crank-pin, by means of the casting *i*.

The parts above just described arranged in the relative position to the crank shown in Figs. 1 and 2 constitute my improvement, and in the form so presented can be attached to all forms of cranks now employed for this or similar purposes.

The operation of the machine may be thus described: Fig. 1 represents the crank-pin as having passed the quarter-center and approaching the upper dead-center, 2, in doing which the spring *f* is strained and made to assume the form and position shown. The spring now reacts and carries the crank in the direction indicated by the arrow to the position shown in dotted lines with sufficient force to effectually prevent any stoppage upon the dead-center 2, and to carry it past said point to such a position that the motion may be taken up and continued by the action of the foot upon the treadle which next follows, and the crank is carried from the position at *h*, Fig. 1, past the quarter-center to the position shown in Fig. 2, which movement curves and strains the spring in the opposite direction to that shown in Fig. 1, the force of which moves the crank in the direction indicated by the arrow past the dead-center 3 to the position shown in dotted lines, when the treadle resumes its action, and the crank is moved past the quarter-center to the position shown in Fig. 1, from whence it started, thus completing a revolution.

It will be observed that the spring, in the act of carrying the crank past the dead-centers, is returning to its natural condition shown in

the dotted lines in each Figs. 1 and 2, after being strained in passing the previous quarter-center, and that the same strain is put upon the spring in passing each quarter-center, bending the spring in opposite directions alternately. It will also be noticed that the spring furnishes the force simply, and the rod *g* directs said force with respect to the object to be moved and the direction in which it is to move. If the spring exerts a greater degree of force upon one dead-center than in passing the other, the force may be more equally distributed by sliding the stand *d* toward or from the crank, as the case may require, a slot being formed in the stand for that purpose, as shown in Fig. 3.

This device is susceptible of several forms of construction without changing its character and producing the same effect. Thus the rod *g* may take the place of the spring and the spring that of the rod, and the result is the same; or the spring and rod may be of one piece or

spring bent at right angles at the point where the rod is attached, as shown in the figure; or a rigid rod may be substituted for the spring, having a coiled spring attached at either end, whereby the force of said spring may be equally distributed by the rod *g* with respect to the two dead-centers.

Having thus described the construction and operation of my improved device, what I claim as my invention, and desire to secure by Letters Patent, is—

The use of a spring combined with a rod for directing its force, or the equivalent thereof, arranged relatively with the crank substantially as herein described, to effect the purpose set forth.

TURNER WILLIAMS.

Witnesses:

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