(No Model.)

A. K. VIRGIL.

PROCESS OF PRODUCING SPEAKING SPRINGS.

No. 344,465. Patented June 29, 1886.

Fig. 1.

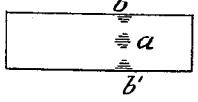


Fig. 2.

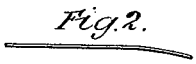


Fig. 3.

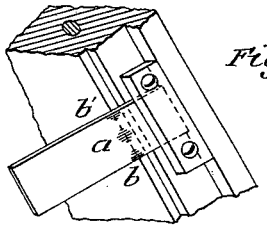


Fig. 5.

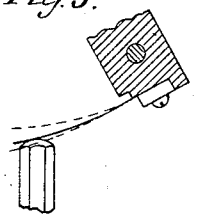


Fig. 4.

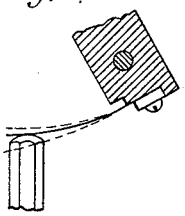
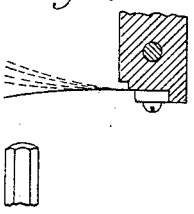


Fig. 6.



Witnesses
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UNITED STATES PATENT OFFICE.

ALMON K. VIRGIL, OF NEW YORK, N. Y., ASSIGNOR OF TWO-THIRDS TO E. S. WILLCOX, OF PEORIA, ILLINOIS, AND GEORGE M. WILLCOX, OF NEW YORK, N. Y.

PROCESS OF PRODUCING SPEAKING-SPRINGS.

SPECIFICATION forming part of Letters Patent No. 344,465, dated June 29, 1886.

Application filed November 7, 1885. Serial No. 182,106. (No model.)

To all whom it may concern:

Be it known that I, ALMON K. VIRGIL, a citizen of the United States, residing at New York city, in the county and State of New York, have invented a Process for Producing Speaking-Springs, of which the following is a specification.

In an application heretofore filed by me as Serial No. 174,083, (being a continuation of an application for the same invention numbered Serial No. 146,164, in renewal of application Serial No. 84,340,) I have described an instrument to be used for the instruction of pupils, and for practice on pianos and organs, and in an application filed June 6, 1885, Serial No. 167,841, I have described an improvement on the instrument described in said continued application, Serial No. 174,083. In both of these instruments a series of speaking-springs are employed. It is desirable that each speaking-spring of a series should speak in unison with the others, and that the instant at which they shall speak may be determinable, so that they can be adjusted to speak at the proper point in the travel of the key. Such a spring I have claimed in an application filed by me June 6, 1885, Serial No. 167,842, of which this application is a division. A spring to accomplish the same purpose may by a careful selection be obtained from speaking-springs made as heretofore for other purposes; but the difficulty of finding a sufficient number of springs having the corresponding characteristics referred to has made it quite necessary that some method should be discovered whereby the speaking of each spring might be subject to regulation. With this end in view I have made my present invention, which is based upon the discovery that when a spring is indented at the center the deeper the indentation the greater will be the distance measured on the arc described by the free end of the spring between the point where the spring speaks in being depressed and the point where it speaks when being released, and also that by making an indentation upon one or both edges of the spring the points at which it will speak can be brought nearer together.

In the drawings, Figure 1 represents a plan view of a speaking-spring of the form which I prefer to use in the instruments described in said applications. Fig. 2 represents an edge view. Fig. 3 represents the manner in which the spring is secured in use, being an isometric view of the bottom. Figs. 4 and 5 represent, respectively, the spring at a point where it may be supposed to be speaking on being depressed, and the point where it may be supposed to be speaking on being released. Fig. 6 represents the spring when not depressed.

In manufacturing these springs, I take a piece of clock-spring steel of about the form shown in Fig. 1, and place the same on a flat anvil, and by means of a punch and a series of comparatively light taps of a hammer compress it about the point *a*, Fig. 1. Upon testing it in a suitable instrument for that purpose I may find, for example, that it requires to be bent to the extent shown in Fig. 4 before it speaks, and that when being released it will speak when still bent in the form shown in Fig. 5.

It will be observed that the spring speaks on being depressed at a different point of its arc of vibration from the point at which it speaks on being released. If it is desired to separate these two points more widely, I still further compress the spring at the point *a* by the same means. On again testing the spring I shall find that the arc separating the points of speaking is longer than before. If the speaking points are too widely separated I, by the same means as before, compress it on the edges, as at *b b'*, either on one edge or both. Very slight compression at these points will generally answer, and on again testing the spring it will be found that the length of the arc between the points at which it speaks has been lessened. Thus by compressing the springs, as may be required, either in the center or on the edge or edges, and testing it from time to time, each spring may be brought to speak at the same point as the others, so that when properly introduced into the instruments described in said applications all the

springs will speak in unison, and may be arranged to speak at points in the travel of the keys corresponding with the points where, in a piano, the damper is raised from the strings and where it is returned to contact with the strings, or at any other point desired.

In the drawings I have shown about the position which I prefer that the points of compression should have with reference to the confinement of the spring; but I do not desire to limit myself to this position.

What I claim as my invention, and desire to secure by Letters Patent, is—

The process of manufacturing a speaking-spring, so as to control the points at which it shall speak, which consists in indenting the same at its center, and also on one or both of its edges, substantially as described.

ALMON K. VIRGIL.

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