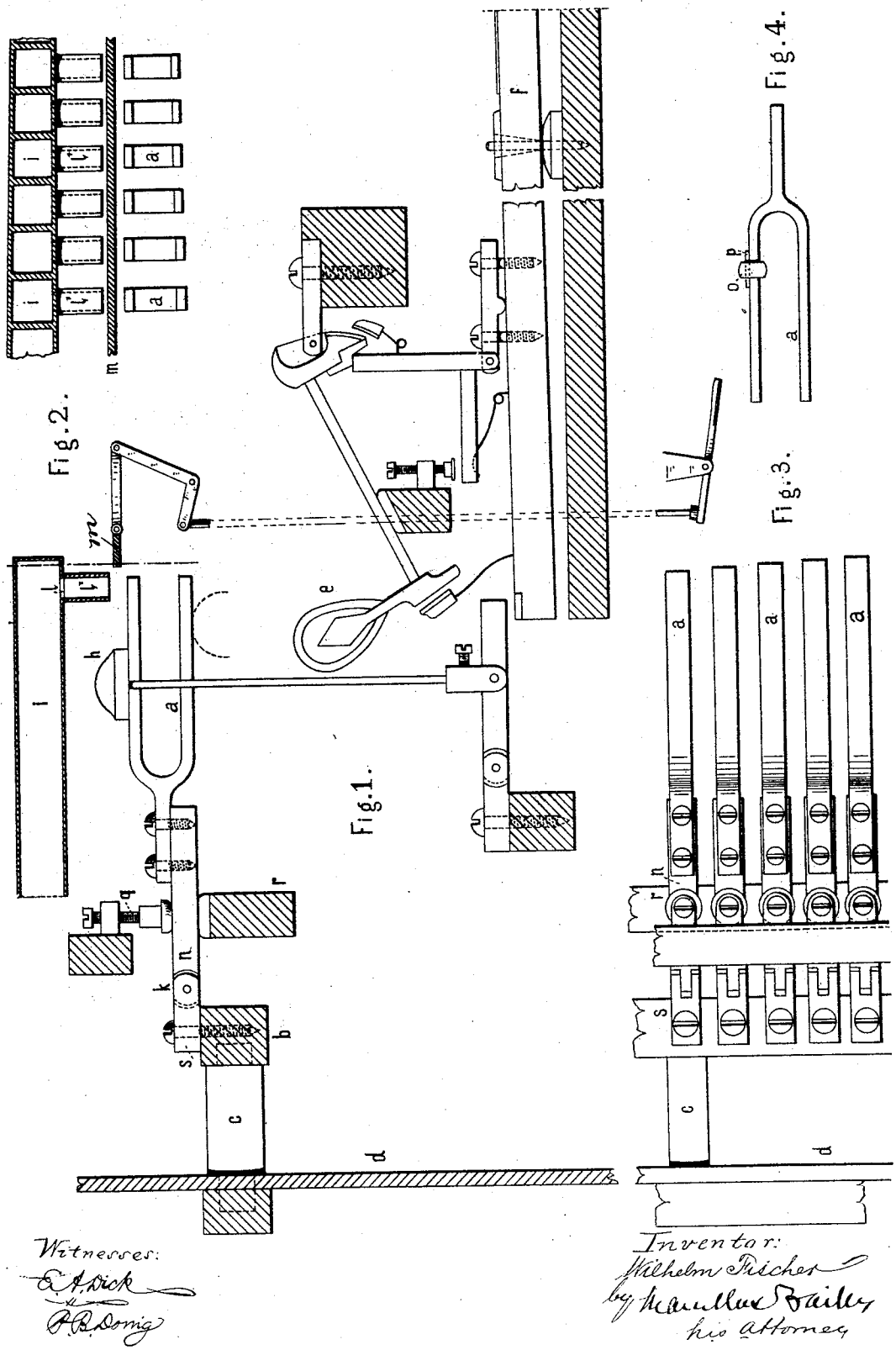
(No Model.)

W. FISCHER.

PIANO.

No. 309,138. Patented Dec. 9, 1884.



Witnesses:
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UNITED STATES PATENT OFFICE.

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PIANO.

SPECIFICATION forming part of Letters Patent No. 309,138, dated December 9, 1884.

Application filed January 19, 1882. (No model.) Patented in England October 6, 1881, No. 4,344; in Belgium October 6, 1881, No. 55,895; in France October 6, 1881, No. 145,177; in Germany October 6, 1881, No. 18,590, and in Austria-Hungary January 25, 1882, No. 39,274 and No. 1,755.

To all whom it may concern:

Be it known that I, WILHELM FISCHER, residing in Dresden, Saxony, German Empire, have invented certain new and useful Improvements in Pianos, (for all or a part of which Letters Patent have been obtained in Great Britain October 6, 1881, No. 4,344; Belgium October 6, 1881, No. 55,895; France October 6, 1881, No. 145,177; Austria-Hungary, No. 39,274 and No. 1,755, January 25, 1882, and Germany October 6, 1881, No. 18,590,) of which the following is a specification.

My invention relates to pianos in which the tones are produced by forks of metal or other suitable material and similar to tuning-forks; and the improvements consist in the particular mode of connecting the forks to the sounding-board of the instrument; in the means employed for rendering their sound more pure, and in a device by which the strength of the sounds may be modulated at the will of the player.

On the annexed sheet of drawings, Figure 1 represents a sectional view of a piano comprising a part of the improvements. Fig. 2 is a sectional end view of the forks and of parts combined therewith. Fig. 3 shows the forks and their attachment in plan, and Fig. 4 the means employed for improving the sound of the forks.

The sounding-forks hitherto used in pianos have always been rigidly fixed within the same, or attached collectively to a bar which is secured to the sounding-board. When a fork thus arranged is struck by a hammer of the piano mechanism, the percussion thus caused is always more or less audible, in consequence whereof the musical effect of the instrument is considerably impaired. For the purpose of remedying this deficiency, I make the connection between the forks *a* and the sounding-board *d* by means of joints or hinges *k*, as shown by Figs. 1 and 3. The fork is screwed with its stem to the part *n* of the hinge, while the other hinge part, *s*, is fixed to the bar *b*, attached by means of the stays *c*, or in other suitable manner, to the sounding-board *d*.

In order to keep the forks in their horizontal position, the hinge parts *n* are supported by a ledge, *r*, which is covered on its upper surface with a soft material—such as felt or leather—and a screw, *q*, provided with a knob, which is also covered with felt or leather, and which presses gently from above on each of the parts *n*.

Instead of the screw *q*, a spring or a weight may be used. This arrangement, which allows the fork to yield to a certain amount when it is struck by the hammer *e*, has proved very efficient, not only for preventing the blow of the hammer from being heard, but also for rendering the sound more sonorous.

According to the experiments hitherto made, it is advantageous in respect to the quality of the sound to place the forks perpendicular to the sounding-board. In case the latter is horizontal, the forks should therefore have a perpendicular position. The arrangement of the forks parallel or at a sharp angle to the sounding-board is, however, not excluded.

The part *n* of the hinge may be made in one piece with the stem of the fork; but I prefer to construct both hinge parts *s* and *n* of wood, and to attach the fork to the part *n*, as shown in the drawings. Instead of the hinge *k*, however, a springing connection between the parts *s* and *n* may be employed, and in this case, especially when the forks are in a perpendicular position, the supports *r* and *q* may be omitted.

The second part of the invention consists in the means for improving the purity of sound of the fork. When a tuning-fork is made to vibrate, the sound produced is not a simple musical note, but a combination of the fundamental note of the fork and of a higher note, called in acoustics the "harmonic," which latter increases in strength as the pitch of the fork becomes lower, and which in the bass-forks even predominates over the fundamental note. This higher note, which impairs the purity of the sound, may be suppressed by placing a ring or band, *o*, made of or lined with an elastic material, tightly around one of the prongs of the fork at a certain point of the same. It has been found that a ring of india-rubber with a piece of felt, *p*, put underneath, is particularly suitable for this purpose. The true position of the said ring must

be determined by experiment, but generally it will have to be located at about one-third of the length of the prong from its point of union with the other prong.

The third part of the invention relates to the modulation of the strength of the notes. As means therefor, I use resonance-tubes *i*, Figs. 1 and 2, together with a slide, *m*, by which their sound-holes *l*, Fig. 1, may simultaneously be closed more or less. Resonance-tubes have been applied already by others for the purpose of increasing the intensity of the sound produced by the forks. The said tubes, which must be tuned in unison with the forks, are fixed above or in general close to the same. When the distance between the tubes and the forks renders it necessary, their sound-holes *l*, which are opposite to the ends of the forks, have to be provided with tubular attachments *l'*. The slide *m*, consisting of a thin bar of wood or metal, or of other suitable material, is so connected with a pedal that it may be brought before the sound-holes or their attachments or shifted away from them at the will of the player. Considering that the vibrations of the air in the resonance-tubes are caused by the transmission of the vibrations of the forks through the sound-holes, it is evident that the former will become fainter the more the free area of the sound-holes is reduced. The arrangement thus affords the means not only of producing sounds of greater or less strength, but also of increasing or diminishing the strength of any note or chord after the forks have been put in vibration.

The hammer mechanism shown in the drawings presents no new features, and does not therefore require any description. Besides, any other mechanism of this kind may be used.

By a suitable arrangement of forks tuned in the octave of those to be struck by the hammers it is possible to obtain in the described instrument an effect similar to that of the aliquot system in stringed pianos.

I claim as my invention—

1. In pianos in which forks are employed for producing sounds, the combination, with the sounding-board *d*, of a series of forks, *a*, each fork being attached to the sounding-board by an individual flexible connection, substantially as and for the purposes hereinbefore set forth.

2. In combination with the forks *a*, attached to the sounding-board *d* by a flexible connection, the supports *r* and *q*, substantially as hereinbefore specified.

3. In combination with a sounding-fork, an elastic ring or band, *o*, placed tightly around one of its prongs for the purpose of suppressing the harmonic of the fundamental note, as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WILHELM FISCHER.

Witnesses:

PAUL DRUCKMÜLLER,

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Both of Dresden.