

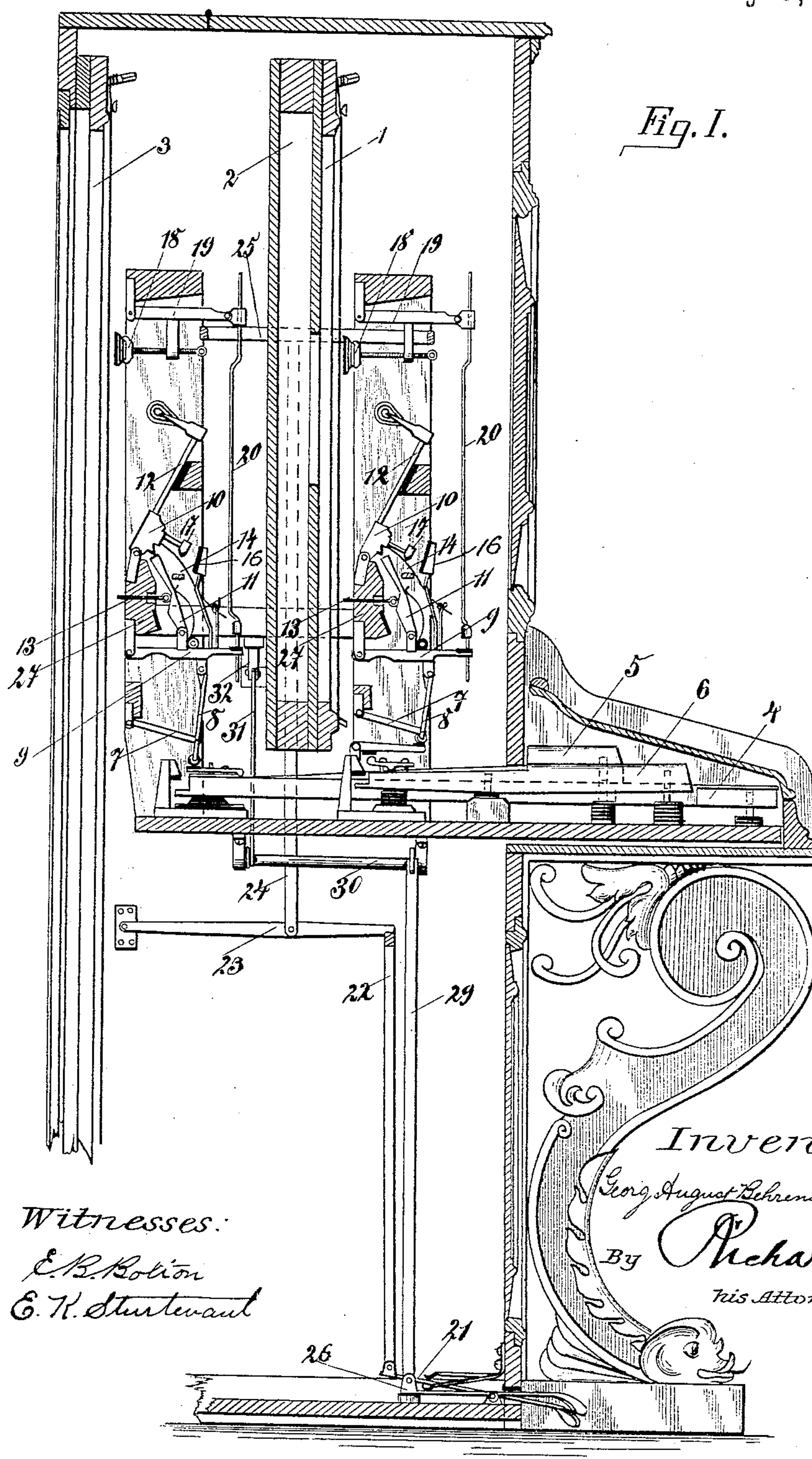
(No Model.)

2 Sheets—Sheet 1.

G. A. BEHRENS-SENEGALDEN.  
PIANOFORTE.

No. 496,845.

Patented May 9, 1893.



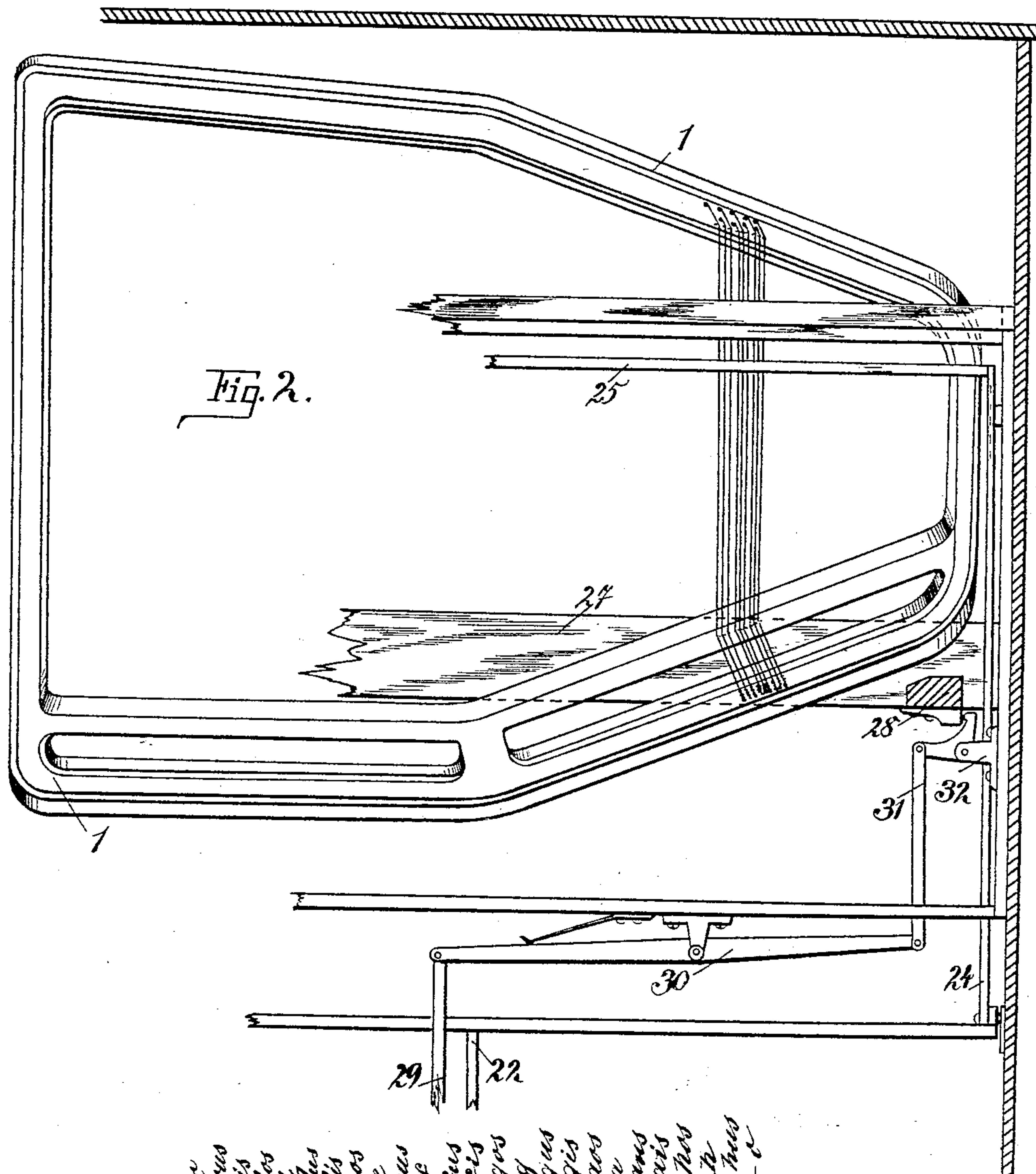
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*Fig. 3.*

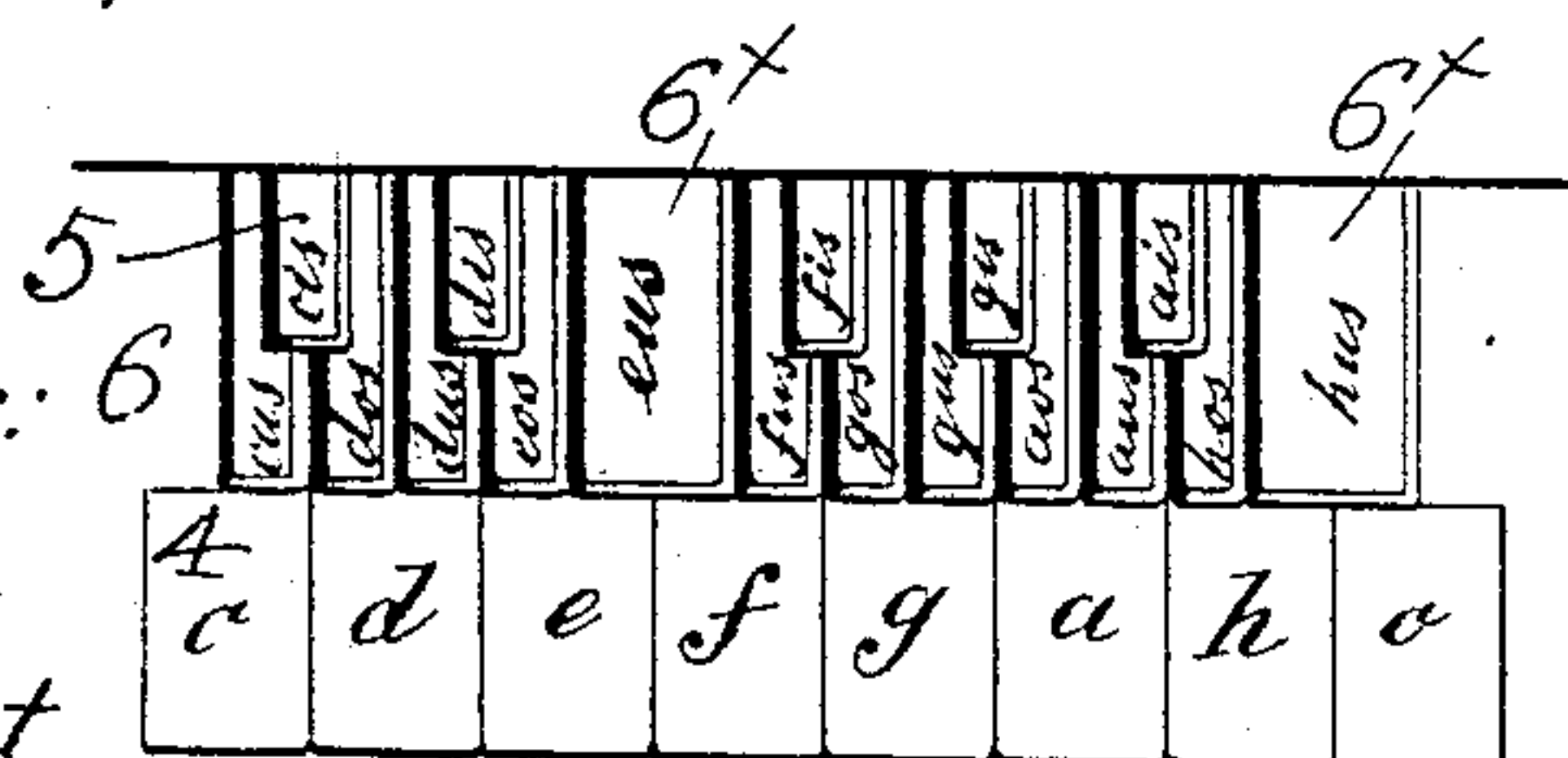
*Inventor:*

~~Erz August Behrens-Senegalden~~

*Richard R.*  
*his Attorneys.*

*his Attorneys.*

Witnesses:  
E. B. Bolton  
E. H. Sturtevant.



By



# UNITED STATES PATENT OFFICE.

GEORG AUGUST BEHRENS-SENEGALDEN, OF LICHTERFELDE, GERMANY.

## PIANOFORTE.

SPECIFICATION forming part of Letters Patent No. 496,845, dated May 9, 1893.

Application filed August 10, 1892. Serial No. 442,713. (No model.)

*To all whom it may concern:*

Be it known that I, GEORG AUGUST BEHRENS-SENEGALDEN, a subject of the King of Prussia, residing at Lichterfelde, near Berlin, Prussia, Germany, have invented certain new and useful Improvements in Pianofortes, of which the following is a specification.

My invention relates chiefly to a pianoforte which, in contradistinction to the well-known pianofortes with scales progressing by half tones, is characterized by progression by quarter tones, that is to say it has full, half and quarter tones. Whereas up to the present time music disposed of about eighty-five notes in seven octaves, the improved instrument has double the number of notes. It is evident that by such an extension of the scales, which is likewise applicable to the organ and also to bow instruments, wood and brass instruments, will afford the composer a larger field.

In the accompanying drawings, which represent a pianoforte having a scale progressing by quarter tones, Figure 1 shows a vertical transverse section through the pianoforte. Fig. 2 is a front view of the holder for the quarter tone strings with the frame for the action, this frame being provided with a shifting device. Fig. 3 is a front view of the keys characterized by the quarter tone progression, together with the scale appertaining thereto.

The tones produced by the raising or by the lowering of a full or large half tone by a quarter tone must be differentiated by the notation. For this purpose any desired signs may be used similar to the sharps and flats, for instance circles (O) may indicate the rise and simple crosses (+) the fall of a quarter tone. Moreover the quarter tones should have names corresponding to the names of the half tones. I have decided to characterize the tones produced by the rise of a quarter tone by the termination us and the tones produced by the fall by the termination os. The c raised by a quarter tone would therefore be named (similarly to cis) cus, and the d lowered by a quarter tone would be named (similarly to des) dos. For the strings of the quarter tones is provided, in the pianoforte represented, a special string holder 1 with a sounding board 2, which parts are arranged in front of holder 3 for the strings of the full and half tones. The keys are divided into three series corre-

sponding to the three kinds of tones, the front keys 4 corresponding to the full and large half tones, the rear keys 5 to the half tones, and the middle keys 6 to the quarter tones. Some of the quarter tone keys as at 6<sup>x</sup> under this arrangement are made larger in order to occupy the space between the keys B. C. E. F. The front and rear keys 4 and 5 of the full and half tones extend below the sounding board of the quarter tones rearward to the rear spring holder 3 and operate the action arranged in front of this holder. The middle keys 6 extend to the front string holder and operate the action belonging to this holder.

The arrangement of the actions for both string holders is well known, being as follows: The movement of the key is first transmitted, by means of a pusher 8 provided with a guide rod 7, to a lever 9 which communicates it, by the pusher 11 acting upon the hammer nut 10, to the hammer 12.

By 13 is designated the disengaging device which on the depression of the key acts against the inclined plane of the pusher 11 and lifts it from the hammer nut. A small string 14 which extends from a wire 15 to the hammer nut 10, insures the back movement of the hammer. The catch 16 takes the nut 10 of the hammer by means of a small head 17 fixed to the latter. The damper pad 18 is arranged on the one-armed lever 19 and is raised from the side as soon as this lever 19, through the medium of the wire 20 connecting the same with the lever 9, is lifted on the depression of the corresponding key.

In Fig. 1 the pedal 21 belonging to the dampers 18 is represented as being pressed downward, that is to say all the dampers are raised. The pedal in this position, through the intervention of a rod 22, a lever 23 and another rod 24, raises a frame 25 which in turn raises all the levers 19, thereby lifting off all the dampers. The second pedal 26 serves for decreasing the strength of tone that is to say for shifting the two actions, the supporting frames 27 of which are connected with each other by beams 28.

As shown in Fig. 2, the pedals 26, by means of a rod 29, a double-armed lever 30 and another rod 31, causes the oscillation of a bell-crank-lever 32, one arm of which effects the displacement of the actions. On the release



of the pedal, these actions are caused to return to their normal position by the action of a spring not represented.

Having now particularly described and as-  
5 certain the nature of this invention and in what manner the same is to be performed, I declare that what I claim is—

1. In combination, in a piano forte, the main action provided with a sounding board, and  
10 having the ordinary full and half tone keys 4 and 5 connected therewith and arranged in rows in the ordinary manner, the latter keys 5 constituting the sharps and flats, a series of quarter tone keys 6 arranged in a row inter-  
15 mediate of the keys 4 and 5 and the independent action and sounding board for said keys, substantially as described.

2. In combination, in a piano forte, the main action provided with a sounding board and  
20 having the ordinary full and half tone keys 4 and 5 connected therewith, a series of quarter tone keys 6, interposed between the full and half tone keys, said quarter tone series

including the large quarter tone keys 6<sup>x</sup> between the small quarter tone keys, substan- 25  
tially as described.

3. In combination, the two actions, the keys 4 and 5 connected with one action, the quarter tone keys 6 connected with the other action, the dampers for the two actions, the 30  
pedal 21, the vertical rod 24, the cross rod at the upper end thereof for operating both of the dampers of the two actions, the connections between the rod 24 and the pedal, the second pedal, the cross beam 28, connected 35  
with the frames 27 of the two actions, the lever 32 acting on the beam 28 and the connection from said second pedal to the lever 32, substantially as described.

In testimony whereof I have signed my 40  
name to this specification in the presence of two subscribing witnesses.

GEORG AUGUST BEHRENS SENEGALDEN.

Witnesses:

A. VOGT,

W. HAUPT.