(No Model.)

H. W. SMITH.

PIANO CASE.

No. 409,513. Patented Aug. 20, 1889.

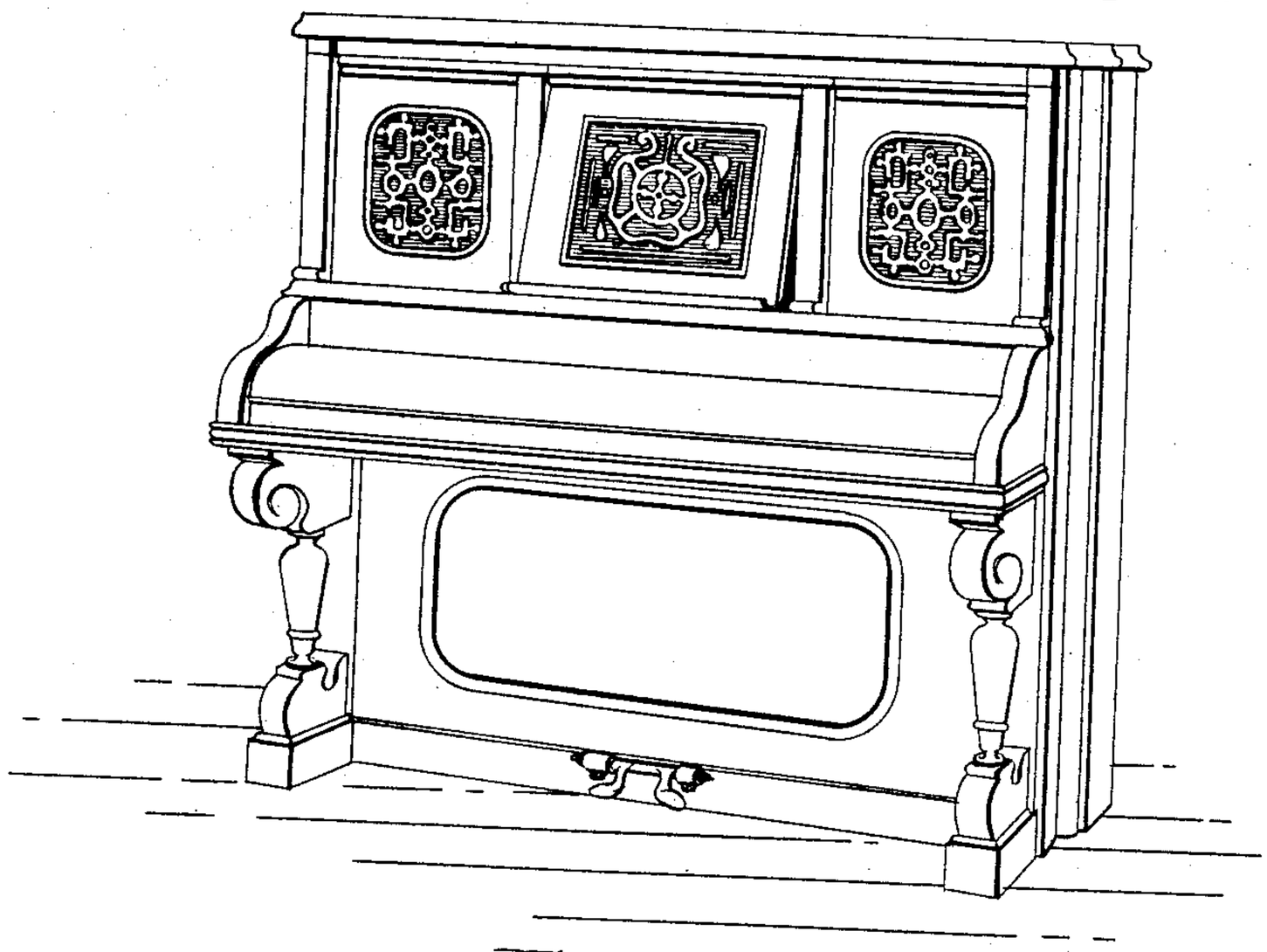

Fig. 1.

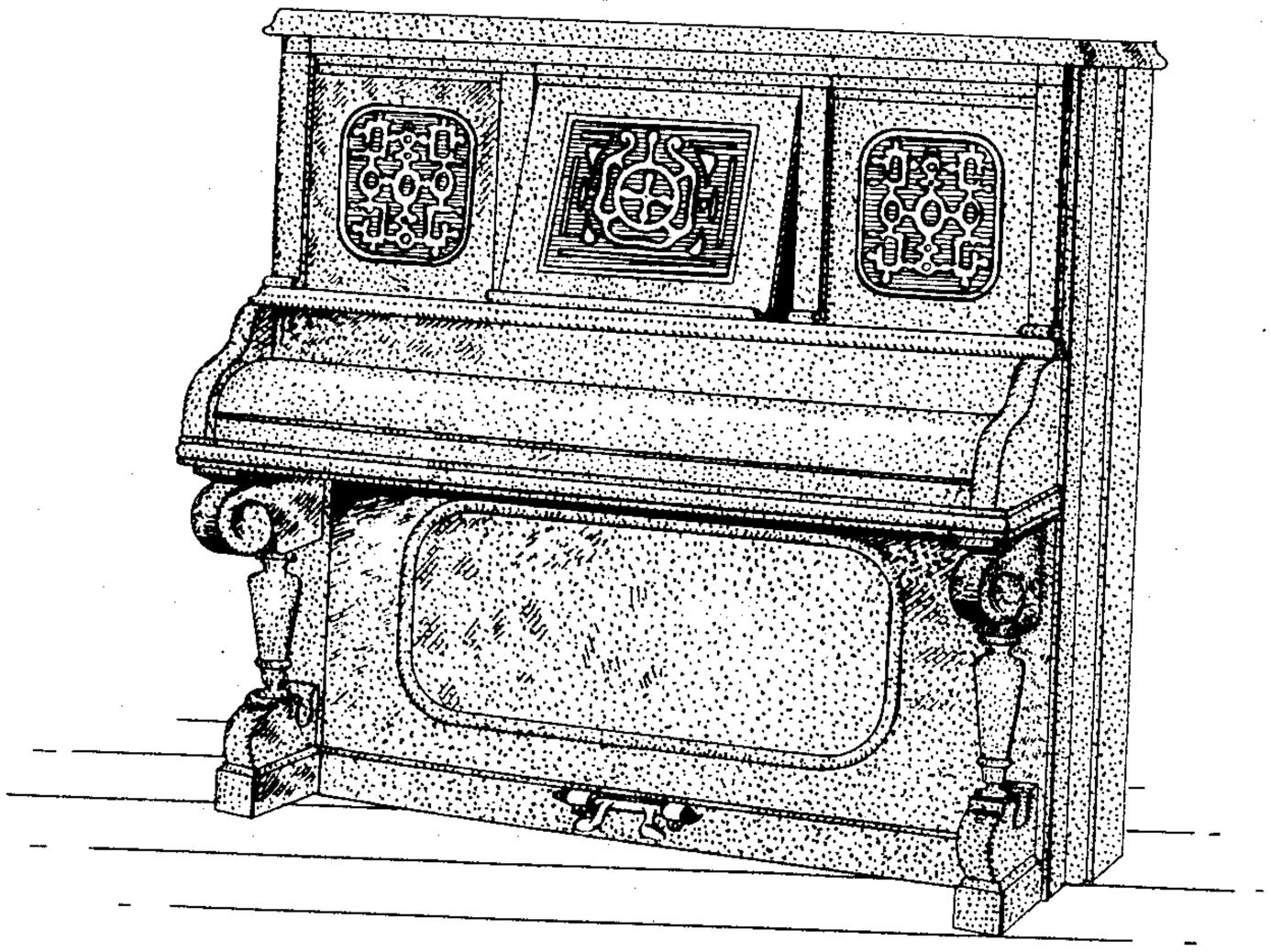

Fig. 2.

Witnesses
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UNITED STATES PATENT OFFICE.

HENRY W. SMITH, OF BOSTON, MASSACHUSETTS.

PIANO-CASE.

SPECIFICATION forming part of Letters Patent No. 409,513, dated August 20, 1889.

Application filed October 20, 1888. Serial No. 288,667. (No model.)

To all whom it may concern:

Be it known that I, HENRY W. SMITH, of Boston, Massachusetts, have invented a new and useful Improvement in Pianos, of which the following is a specification.

It is well known that the case of a piano is put into vibration when the keys are struck. These vibrations are manifest to the sense of touch when a hand is laid lightly upon the case. They may be made apparent to the eye by placing a cup of mercury upon the case and watching upon its surface the reflection of the flame of a candle or other object. They are, I believe, more or less inharmonic with the vibrations of the strings and sounding-board. They undoubtedly communicate vibrations to the air in contact with the case, which must, I think, mingle with and modify the sound-waves coming from the sounding-board, and injure or impair the tones due directly to the strings and sounding-board. The specific character of these vibrations is probably determined by the form and material of the case, as sonorous bodies in vibration generally give out sounds peculiar to themselves.

My improvement lies in applying to the surface of the wood of a piano-case a coating of cloth. This gives a soft and yielding surface, which, as compared with a varnished or unvarnished surface of wood, is quite inelastic. The result of this change in the surface of a piano-case is that much purer and sweeter tones are obtained, with greater distinctness, and without loss, so far as I can judge, in the volume of sound. The improvement of the quality of the tones is very marked and very desirable. The effect of the cloth coating appears to be to insulate the air from the wood of the case, and thus to suppress the effect upon the sound-waves coming from the strings and sounding-board of inharmonic or unsympathetic vibrations peculiar to the case itself. Much harder hammers can be used in a case of this kind than in the ordinary kind, and more distinct and clearer tones obtained. Such hammers are less liable than the ordinary soft hammers to a change in their condition, and thus the quality of the tone of an instrument will be, I believe, less liable to change.

There are other incidental advantages in the use of cases coated as I propose which are important, though not directly relating to the musical quality of an instrument. The time required to finish a case by varnishing and polishing is about three months, while a coating of cloth may be applied in a single day. A coating of varnish is liable to crack and become unsightly. A cloth coating is not subject to this evil, and it will, I believe, protect the instrument more effectually from moisture and changes of temperature. My invention, however, has especial reference to the improved acoustic results which are secured by its use.

In the drawings hereto annexed, Figure 1 represents an ordinary upright piano with the surface of the case finished by varnishing and polishing in the common manner. Fig. 2 represents a piano of the same kind, the case of which is finished by gluing to its surface a coating of silk plush, which is soft and comparatively inelastic.

The dotted parts of the drawings represent the surface of the plush attached to the surface of the case.

In speaking of the surface of the wood as being in contact with the air, I include varnished as well as unvarnished surfaces. As with reference to the acoustic phenomena referred to, I think the effects are the same.

I am aware that pianos have been made prior to my invention with metallic cases lined with a fleece, or a cushion stuffed with wool, and make no claim thereto, for such a lining applied to the inside of a metallic case, or even to the inside of the ordinary wooden case of a piano, whatever might be its effect upon the vibrations of the case, would absorb a large portion of the sounds due to the vibrations of the strings and sounding-board of the instrument, and thus largely impair its value, whereas in the use of my piano in which a coating of cloth is applied to the outer surface of the wooden case, the sounds due to the vibrations of the strings and sounding-board are, as before stated, so far as I can

judge, given out in their full volume. The loudness or volume of the sound of a piano is undoubtedly due, to a considerable degree, to the reflection of the sounds from the inner surface of the case, and this reflection must be greatly checked by the lining of such surface with an inelastic material.

I claim—

A piano with a wooden case having its outer surface insulated from the surrounding air by an inelastic coating of cloth or other similar material, substantially as described.

HENRY W. SMITH.

Witnesses:

WALDRON BATES,

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