

longer piece *a'* being glued to the under side of the shorter piece *a*, and being of sufficient length to extend forward to the front transverse rail *c*. This extension of the longitudinal braces forward to the front rail of the bed greatly strengthens the structure.

The cast-iron frame *D* of the piano rests upon the upper ends of the iron pillars *d*, which are firmly fixed in the wooden bed, and project vertically therefrom to a sufficient height to raise the iron frame clear above the sounding-board *E*. The iron frame is secured to the pillars by means of the screw-bolts *d'*, which pass through the frame, and are received in holes tapped into the upper ends of the pillars *d*. Those of the pillars *d* which pass through the sounding-board pass through holes *d''* in the sounding-board, which are larger in diameter than the diameter of the pillars. There is thus no contact of the sounding-board with the metallic frame or pillars, and it is, therefore, enabled to vibrate free from any effect which might be produced by its contact with metal.

It will be seen that the pillars *k k k* are arranged some distance in front of the belly-rail, and therefore near the agraffes, in the position where they contribute more effectually to stiffen the frame.

The wrest-plank *F* is inserted between the front transverse ribs *f* and *f'* of the cast-iron frame. The front transverse rib *f* is strengthened, to resist the strain which might result from the swelling of the wrest-plank, by its connection with the longitudinal ribs *f'' f'' f''* of the frame, which extend over the wrest-plank from the inner portion of the casting to the front rib *f*. By thus strengthening the front rib I am enabled to fit the wrest-plank very closely to its bearings in the frame, and drive or press it into the seat between the ribs *f* and *f'*. By thus rigidly gripping the wrest-plank, danger of splitting it in driving the wrest-pins is wholly avoided.

The ordinary mode of fastening the front edge of the sounding-board is to glue it to the top of the belly-rail, as shown at *G* in Fig. 5.

As the upper or treble portion of the sounding-board is of small area, its capacity to vibrate is greatly diminished by the rigidity with which it is held.

In order to give the upper portion of the sounding-board more freedom to vibrate, I have devised the mode of construction shown at *H* in Fig. 5, in which it will be seen that the upper portion of the sounding-board, instead of hav-

ing its front edge glued to the top of the belly-rail, has its front edge supported upon one or more piers, *h*, and secured thereto by the screws *h'*. Thus the greater portion of the front edge of the upper part of the sounding-board is unconfined, and vibrations are more easily generated therein, and when generated are more persistent than they are when the entire edge of the sounding-board is rigidly affixed to the belly-rail.

In order to strengthen that portion of the edge of the sounding-board which is thus left unsupported, I re-enforce it with the strip *E'*.

If desired, the entire front edge of the sounding-board may be provided with the re-enforcing-strip *E'*, and may be supported at intervals upon piers, instead of being glued to the belly-rail. This mode of construction, however, is of greater importance in the case of the upper portion of the sounding-board. By means of it the upper notes of the piano are greatly improved in their singing quality, sweetness, and volume.

I claim as my invention in a grand piano, substantially such as described—

1. The longitudinal wooden braces *a* of the bed, provided with the extensions *a'*, reaching forward from the junction of the braces with the belly-rail *b* to the front rail *c* of the bed, substantially as and for the purpose set forth.

2. The metallic string-frame *D*, supported upon and secured to the pillars *d*, projecting vertically from the wooden bed, as and for the purpose described.

3. The longitudinal ribs of the metallic frame, extending forward to the transverse rib *f*, projecting downward in front of the wrest-plank, and constituting the connections *f''* with the inner transverse rib *f'*, as and for the purpose set forth.

4. The pillars *k k k*, arranged in front of the belly-rail, as shown, in combination with the front portion of the iron frame, substantially as and for the purpose described.

5. The sounding-board *E*, the treble or upper portion of which is provided at its front edge with the re-enforcing-strip *E'*, in combination with one or more piers, *h*, by which the desired portion of the front edge of the sounding-board is supported, substantially as and for the purpose set forth.

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Witnesses:

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WM. P. LINCOLN.