Patent Department

AN IMPROVED PIANO RESONATOR.

The art of the modern pianoforte-maker receives too little attention from the musical critic. The reason is not far to seek. To be sure, the critic knows whether or not the tonal quality of the piano is good; but he knows little or nothing of the skill and the scientific knowledge which are required in perfecting an instrument which has attained such general popularity. For that reason the critic is apt to praise the virtuoso for qualities which he should more justly attribute to the piano itself.

The constant improvement to which the piano has been subjected during the last quarter of a century has not been without its effect upon the style of playing, as well as upon musical composition. Indeed, many of the works of our ultra-modern composers could never have been effectively performed on the pianos used by Chopin and his contemporaries.

One imperfection in the modern pianoforte, found even in the instruments made by standard makers, has been the loss in tone quality, due to the inability of the sounding-board to retain its tension. The problem seems at last to have been satisfactorily solved by a most simple and ingenious construction invented by E. A. and R. W. Gertz, and embodied in the pianos of Mason & Hamlin, of Boston, Mass.

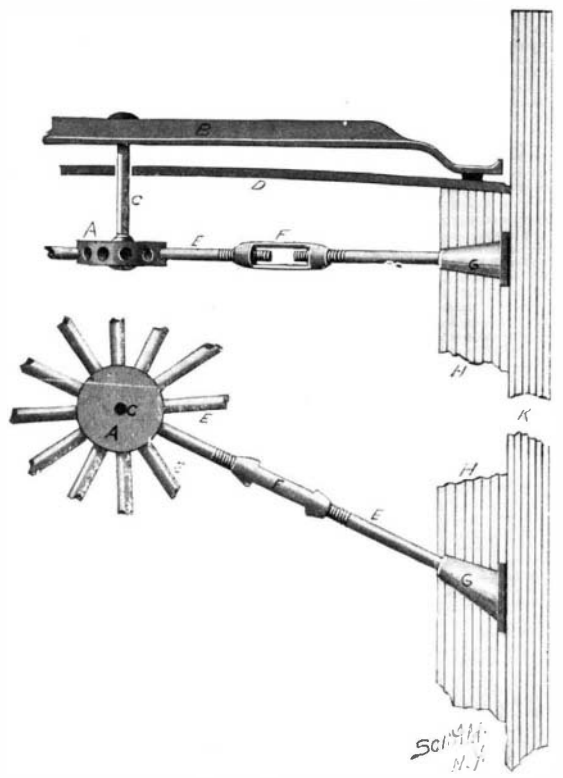
Doubtless the question has presented itself to many of our readers, Why is it that a violin improves with age and that a piano deteriorates? A comparison of the construction of the sounding-boards of the two instruments will give a satisfactory explanation.

The sounding-board of a violin has a permanent shape. The stiffening-post which is inserted within the instrument directly beneath the bridge, where the greatest strain is exerted, connects the board with the back and thus prevents a rupture of the board at its weakest point. The tense strings and the vibrant board are a unit in themselves, the strain of the one counteracting the strain of the other.

In the piano the case is different. The best pianos are provided with sounding-boards slightly arched, over which the strings extend. The strings being spread over the entire surface, must necessarily be on a straighter surface than on a violin, where the four strings bear upon a very small part only of the sounding-board. Therefore the tremendous strain of the strings on a modern piano has the tendency from the first to force down the arch of the board. In the very finest and most expensive pianos the strain of the arched board against the strings, and the strain of the strings against the arched board, is so finely adjusted that the one counterbalances the other. That is to say, the sounding-board is able to carry the strain of the downward-bearing strings, and at the same time is pliable enough to yield to the slightest vibration of the strings. If the sounding-board is too stiff and heavy only violent vibrations will affect it, and it will throw out only a blunt, dull sound. On the other hand, if the sounding-board cannot carry the strain of the strings properly there will not be the proper resistance, and the sound will be wiry and thin, "tinpanny," in other words. So sensitive is the wood to climatic changes that the piano sounding-board loses its shape very easily. Under certain conditions the sounding-board will expand, and the soft and hard fibers of the wood will be pressed together, which in itself results in no injury; under other conditions the sounding-board will contract so that it assumes a perfectly flat shape. Even if the board does not crack after contraction, as it often does, the loss of its original convex shape results in a great loss of tone, owing to its inability to bear against the strings as it once did. The result is a deterioration of tone in all pianos when old, no matter how finely they sounded at one time. Since the loss of shape is permanent, the loss of tone is permanent.

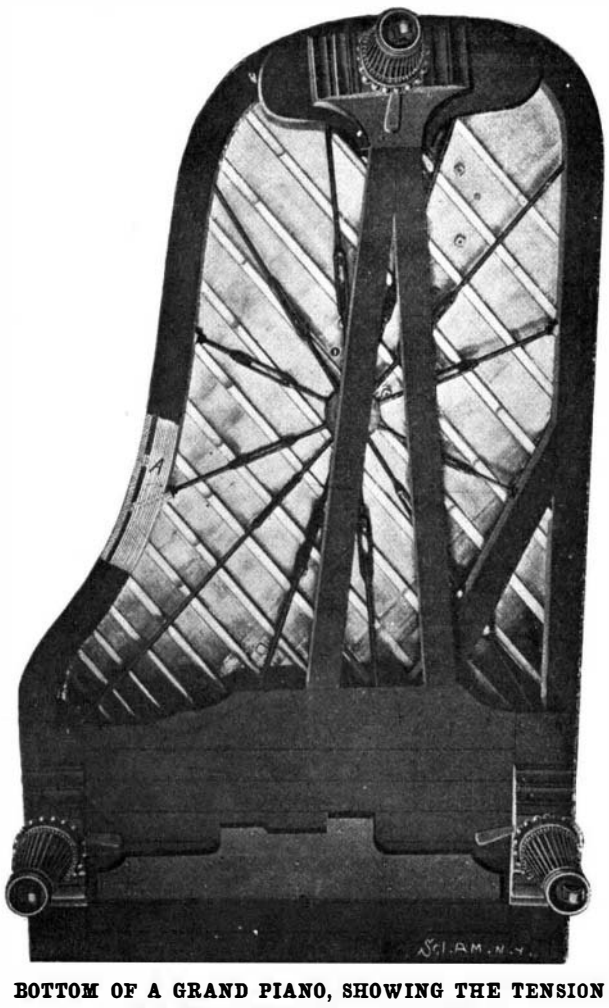
The wood being as good as it ever was, it follows that were there some means of restoring to the sounding-board its original convex form, so that it would bear upon the strings as it originally did, the tone would surely return. By means of the new construction, to which we have referred, not only is this much-desired end attained, but something more. The sounding-board bears with greater pressure and far more vitality against the strings than the necessarily thin sounding-board could in itself. This extra pressure against the strings, which the contracted board gets by means of tension rods, is entirely different from the rigid stiffness of a too heavily constructed board, and by this method the musical quality of the instrument is much improved. The tone is no longer merely a concussion sound, changing its quality and diminishing its quantity immediately after the key has been struck, but a clear resonant vibration of constant quality and size, of great singing capacity and of rare beauty. The quality of immediate responsiveness is not lost. It is no longer necessary to force the piano in order to obtain great sonority; for the instrument responds at once with little effort.

The construction by which these results are obtained is clearly shown in the accompanying illustra-



DETAIL VIEW OF SOUNDING-BOARD RIM AND TENSION RODS

tions. The sounding-board support of the instrument is a rim, *H*, which is made of a series of thin layers of seasoned wood, glued together and surrounded by the casing, *K*. Upon the rim thus formed the sounding-board, *B*, is firmly secured. For the purpose of regulating the compression of the rim, and consequently of adjusting the tension of the sounding-board, a series of tension members, *E*, is employed, radiating from a central disk, *A*. These tension members are thin metal rods, headed at their outer ends and passed through the rim. Each tension member is composed of two parts, which are oppositely threaded at their adjacent ends to receive turnbuckles or nuts, *F*. In order to adjust the tension of the rods, to draw upon



BOTTOM OF A GRAND PIANO, SHOWING THE TENSION RODS AND SOUNDING BOARD RIM, A.

the rim, and therefore to regulate the tension of the sounding-board against the strings, it is simply necessary slightly to rotate the turnbuckles.

To the mechanic it will be evident that the enormous strain exerted by the rim upon the tension members requires a peculiarly constructed head; otherwise the members would be torn from their fastenings, or at least would gradually slacken. The peculiar manner in which these heads are constructed is clearly shown in one of our detailed illustrations. Each head, *G*, consists primarily of two parts—a tapered foot and a plate so inclined that it lies flat against the rim. From this design it follows that the greater the strain upon the tension rods, the more securely are they held in place.

Every portion of the rim and the corresponding section of the sounding-board can be compressed and regulated as desired. When the sounding-board has been flattened out by reason of climatic conditions, and the piano has lost its old sweetness, a slight rotation of the turnbuckles is all that is necessary to arch the sounding-board up against the strings and to restore to the instrument the tone for which it was once admired. Furthermore, the distortion of the rim which occurs in most pianos is prevented, the tension members preserving the shape of the rim far better than the ordinary solid post construction. So great is the strain upon the rim that any tendency to relaxation which usually follows atmospheric and climatic changes can never affect the tension to any degree. The tonal quality is consequently retained indefinitely, so that the action is the only portion of the instrument which is subject to any wear—a defect easily remedied by a good mechanic. Since the piano can never lose its tone, it would seem that some of the qualities which are gained by violins with age should be acquired by the piano hereafter.

The construction is not untried. A piano fitted with this new resonator was used last year by Harold Bauer. The critics who commented upon his work praised him for the wonderful sweetness and singing quality of his tone, attributing the graceful effects produced to the early training which he had received as a student of the violin. No doubt much of the charm that graced Bauer's playing may be credited to interpretive skill, but much of it was also due to his instrument.

Brief Notes Concerning Patents.

It has been announced from Copenhagen that an American syndicate has made an offer of $600,000 for the rights of the company controlling the Poulsen telegraphone as well as an interest in the new company. The deal had not been consummated at last reports.

After a lapse of thirty years the estate of Samuel F. B. Morse has been distributed pursuant to a decree of the Supreme Court. The gross estate of the inventor of the telegraph amounts to $524,000. The management of the estate has cost so much that after deducting expenses there was left for final distribution only $346,000.

Cornelius Vanderbilt recently made a personal test on the Manhattan Elevated Railway of New York of a smoke-consuming device for locomotives in which he is interested. The inventor of the device is W. S. Hughes, of Philadelphia. It is said that the test proved how feasible it is to do away with the smoke nuisance on locomotives.

One of the contemporaries of Singer and Howe, Mr. James H. Whitney, died in Boston, August 28, at the age of eighty. Mr. Whitney was one of the first generation of prominent promoters of the sewing machine industry. His interest in the business began in the interval between Howe's invention and the succeeding era, when Singer and Wilson put the Howe and Bachelder principles in practical shape.

Some of the residents of the town of Spencer, Mass., proud of the distinction which that place bears in being the birthplace of Elias Howe, Jr., the inventor of the sewing machine, have erected an 18-foot sign along the tracks of the Boston & Albany Railroad which announces this fact to the passengers in bold letters which cannot avoid being seen by the passengers on the fastest trains which pass over that road. The sign reads as follows: "Down in the valley below Elias Howe, Jr., the inventor of the sewing machine and an illustrious son of Spencer, was born in 1819." After the words "Down in the valley" a huge hand points to the birthplace of the inventor.

Among the recent electrical inventions of interest is the self-ejecting telephone plug of Charles F. Butte, which will greatly reduce the work of the central station attendants and facilitate the service. The plug tip carries a sleeve which slides upon the shank of the tip and is normally pressed outward by a spiral spring contained in the handle of the plug. Upon pushing the plug into the jack this sleeve is forced back into the plug handle by the face of the jack and is caught by a latch pivoted near the center of the handle. At the rear end of the handle is a small electromagnet adapted to draw the rear end of the latch downward and release the sliding sleeve. This magnet may be connected with the clearing-out circuit, so that when the subscriber hangs up his telephone the magnet is energized and draws the latch downward; the spiral spring then forces the plug from its place.