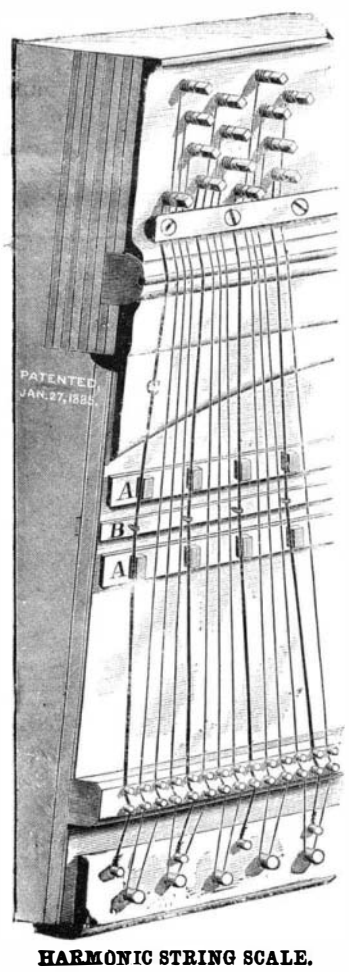
IMPROVEMENTS IN UPRIGHT GRAND PIANOS.

Very many people who would like to have grand pianos are deterred therefrom on account of the large space the instrument takes up in an ordinary parlor; and the ungainly triangular shape in which most of them are made renders it extremely difficult to place them to advantage in any ordinary apartment as usually arranged. An upright piano, which hardly takes up more room than a bookcase, does away with this difficulty, but in such instruments it has been almost impossible, until a comparatively recent period, to obtain the purity and permanence of tone and the volume expected from a grand piano. Manufacturers of pianos have for years devoted much attention to this branch of their business, and we herewith illustrate some recently patented improvements, especially designed for this class of instruments, which have been introduced by Messrs. Behr Bros. & Co., of New York city. The firm make a specialty of upright pianos, but its members have not been content with the instrument as it was originally made, and the history of their manufacture has been marked by the introduction of numerous new features and a steady progress in improvement.

NEW UPRIGHT GRAND PIANO.

One of the most important of the recent inventions incorporated in these pianos is that of the harmonic string scale, which originated with Mr. Paul Gmehlin, a member of the firm, and which is shown in one of our illustrations. The invention consists of an extra string (C) next to the three strings of the tri-cord, but on a lower plane, and consequently not struck by the hammer. This extra string vibrates in common with three strings of the octave above it, the prime vibrating with its octave and super-octave producing the correct overtone vibrations. The volume of tone thus produced is remarkable, the reverberations of the notes giving the piano a most singular singing capacity. The extra string passes through an agraffe attached to a bridge (B) fastened upon the sounding board, dividing the string into two equal parts. The bearing of the extra strings being in the opposite direction of those of the scale proper gives the sounding board additional firmness. A buff damper (A), operated by a separate pedal, stops the vibrations of all the strings except those that are struck by the hammers, consequently avoiding confusion of tones. The resources of the piano are greatly increased by this ingenious invention of Mr. Gmehlin. Neither are the tuner's labors enhanced, as the additional string can be easily drawn up, being so placed as to be readily reached.



HARMONIC STRING SCALE.

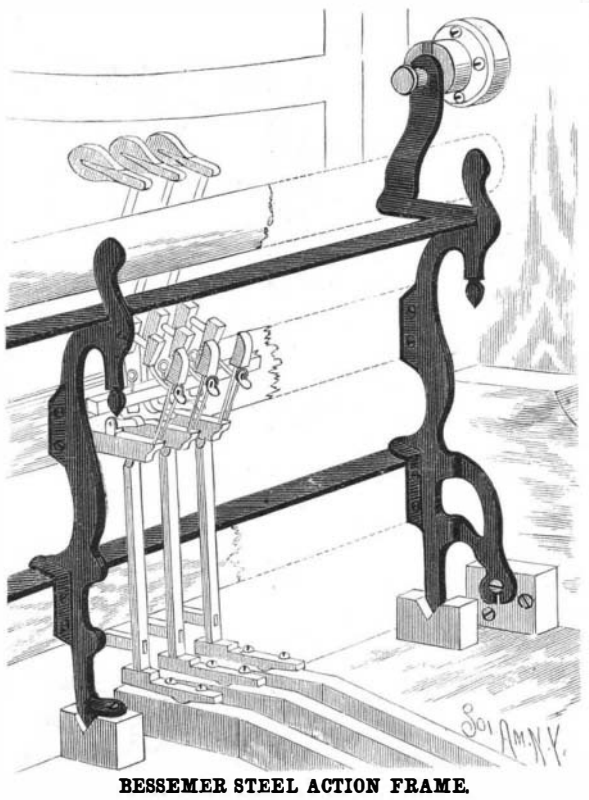
In connection with this point it is important also to notice the patent string bridge and pin block, likewise invented by Mr. Gmehlin, and which has much to do in contributing to a sustained singing quality of the instrument, at once removed from a dull wooden tone or a sharp metallic ring. To this end the bridge over which the treble strings pass is made of end wood maple, instead of wood used in the ordinary way by other makers.

The pin block is peculiarly constructed, being made out of eight thicknesses of maple veneer, vertically crossing and recrossing each other, which firmly hold the tuning pins, and enables the piano to remain longer in tune than is the case with the ordinary construction.

The Bessemer steel action frame, also an invention of Mr. Gmehlin, is simple and strong, as well shown in the engraving, holding the action with such absolute firmness that no unfavorable condition of the atmosphere can in any way affect it. This, it is hardly necessary to say, is one of the most important elements in the piano manufacture in contributing to evenness of touch and tone; for without such strength and stability in the action frame all other work on the instrument could be of little permanent value. This action frame is also comparatively light of weight, and its position, with regard to the action and case, is such as to admit of easy inspection without necessitating its removal from the case.

Another improvement, which cannot fail to be appreciated by all experienced piano players, consists of a patent finger-board protector, to be found only on the pianos made by this firm. It consists of a nickel plated strip, so attached to the concave name-board that it effectually precludes the possibility of marring the front of the piano with the fingernails. Scratching of the woodwork just above the keys is so common on pianos that have been much used that this improvement will be welcomed by all who take pride in keeping their instruments looking well.

The unique case and the cylinder top, which are distinctive features of these pianos, are well represented in the illustrations. The construction of the cylinder top is very simple, consisting of a segment, or curved panel, *c*, swinging under the flat top, *t*, on two small arms or brackets, *a*, which are pivoted to the sides of the case at *p*. To open the piano requires but a gentle pressure applied at the lower edge, *m*, of the cylinder top, which then takes the position indicated by the dotted lines, and leaves an opening between the upper frame, *u*, and the lid, *t*. Its object is primarily to utilize the top of the upright piano as a mantel, by making it possible to leave the same intact when increased volume of sound is desired. In the ordinary construction, consisting of a hinged top, which can be raised to allow the waves of sound to escape (such provision being highly essential in upright pianos), the turning over of the lid upon the rear half of the top necessitates the removal of all books, sheet music, or ornaments which may have been placed there either temporarily or permanently.



BESSEMER STEEL ACTION FRAME.

The graceful outline of the cylinder top, when closed, presents a far more pleasing appearance to the eye than the angular box-like ending of an ordinary upright piano. When open, there is disclosed to view the beautiful and delicate mechanism of the interior, and the bright gold of the bronzed iron frame contrasting with the rich, dark color of the wood surrounding it produces a charming effect. Thus the upper portion of the instrument, which usually appears to the least advantage, is made the most ornamental part of the piano.

The cases of these pianos are unique and extremely rich in ornamentation, but the firm have acquired a reputation for careful construction and conscientious workmanship in all the details of the instrument. The touch is elastic, the action uniform and even, and the tone rich, powerful, and mellow, with singing qualities of a high order. The principal warerooms of the firm are at No. 15 East Fourteenth Street, New York, with a large factory corner of Eleventh Avenue and West Twenty-ninth Street. This factory has been built only about two years, in place of a former one burned down, and is completely equipped with all the latest modern machinery and appliances. The facilities for kiln drying lumber are unsurpassed; the drying house containing four chambers, in which one hundred thousand feet of lumber may be kiln dried at one time by the best process known to science. In the adjacent boiler house there are two boilers, one of one hundred and twenty, the other of eighty horse power, which furnish the necessary amount of heat required for this purpose, as well as the requisite steam for the one hundred horse power engine which runs the machinery and elevator. The varnishing of the piano cases is carried on in a building adjoining the main factory. The spacious lumber yard is at the terminus of the New York Central and Hudson River Railroad, and consignments from the West are brought by the car load to the yard, where they are unloaded and stacked.

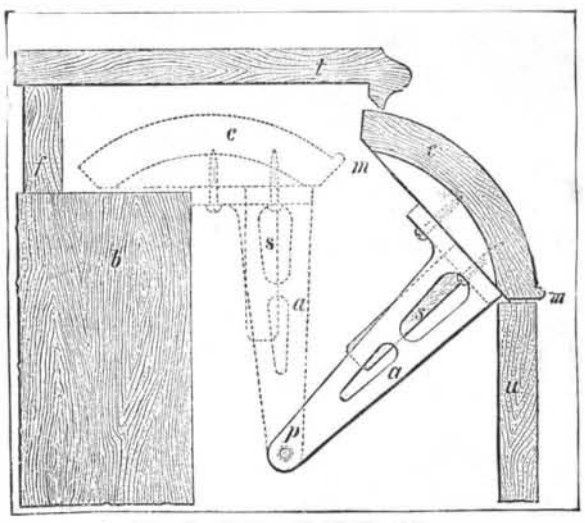


DIAGRAM OF CYLINDER TOP

The pianos of Messrs. Behr Bros. & Co. have received the warmest indorsements of eminent musicians as among the best instruments now made.

At the recent Exposition in New Orleans, the firm were awarded a medal of the first class for "piano (upright), harmonic scale (fourth string) with damper attached and pedal for same; the quality of tone, which is remarkably fine, by its power and brilliancy, the singing qualities of the instrument, the touch even throughout, the construction, excellence of design, and perfection of workmanship; the quality of tone is due to Mr. Gmehlin's new invention by adding a fourth string."

The Ammoniaphone.

A correspondent, referring to the description of the ammoniaphone published in a recent issue of the SUPPLEMENT, suggests that a valley whose atmosphere was *almost saturated* with peroxide of hydrogen and free ammonia gas would doubtless produce a heavenly voice, but that its melodies would only be heard in a place far more beautiful even than Italy. Such a peaceful spot might not produce a Guiglini, but it would very speedily produce something more ethereal.

Lemons for Malaria.

Dr. Crudelli, of Rome, gives the following directions for preparing a remedy for malaria which may be worth trying, as it is said to have proved efficacious when quinine has given no relief. Cut up a lemon, peel and pulp, in thin slices, and boil it in a pint and a half of water until it is reduced to half a pint. Strain through a linen cloth, squeezing the remains of the boiled lemon, and set it aside until cold. The entire liquid is taken fasting.

Practice and Theory.

In a lecture on the "Reflective Powers," James Freeman Clarke makes the following pertinent remarks: "There is an objection often urged against these higher reflective faculties in their exercise for common objects—that they give theoretical rules which are not practical. Thus, if one not actually engaged in teaching suggests any new view intended to improve the processes of education, he is apt to be told that this is not 'practical.' It is sometimes even assumed that theory and practice are opposed to each other. We often hear it asserted that a notion may be 'true in theory but false in practice'; that is, useless for practical purposes. I, for one, esteem practice. I trace all real knowledge to experience. I care for no theories, no systems, no generalizations, which do not spring from life and return to it again. I feel, perhaps, undue contempt for the vague abstractions we often listen to, idle figments of an idle brain, speculations with no basis of sharp observation beneath them. Yet we are in danger of going too far in this direction, and of undervaluing theory in its proper limits. People often eulogize *practice* when they only mean *routine;* boasting themselves as practical teachers, intending thereby that they only do what always has been done, and do not mean to do any better to-morrow than they did yesterday. Practice and theory must go together. Theory, without practice to test it, to verify it, to correct it, is idle speculation! but practice without theory to animate it is mere mechanism. In every art and business, theory is the soul and practice the body. The soul without the body in which to dwell is indeed only a ghost, but the body without a soul is only a corpse. I sometimes pass a sign on which the artisan has painted, "John Smith (or whatever the name may be), Practical Plumber." I should not wish to employ him. When the water-works in my house get out of order, I want a theoretical plumber as well as one who is practical. I want a man who understands the theory of hydrostatic pressure; who knows the laws giving resisting qualities to lead, iron, zinc, and copper; who can so arrange and plan beforehand the order of pipes that he shall accomplish the result aimed at with the smallest amount of piping, the least exposure to frost, the least danger of leakage or breakage; and this a merely practical man, a man of routine, cannot do. The merest artist needs to theorize, *i. e., to think*—to think beforehand, to foresee; and that must be done by the aid of general principles, by the knowledge of laws."

The St. Petersburg and Cronstadt Maritime Canal.

The Cronstadt Canal was opened on May 20 last, this being the second anniversary of the coronation of the Czar.

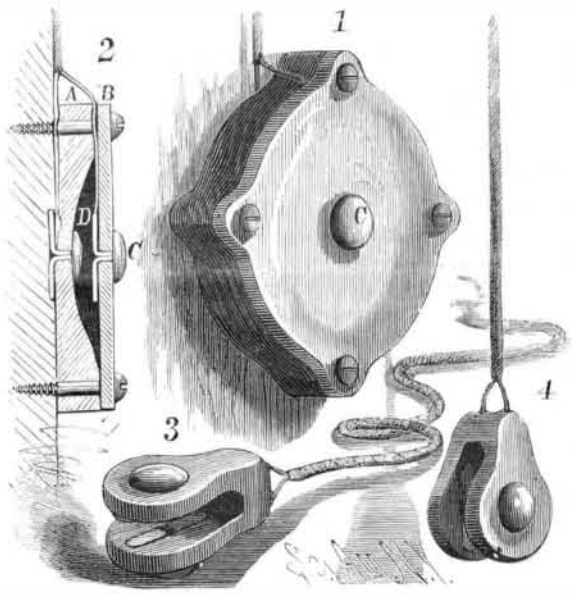
After a religious service, the Emperor and Empress went on board the magnificent yacht Dershava, anchored at the spot where the canal commences. At a quarter past twelve o'clock the Dershava proceeded to Cronstadt. Near Cronstadt the entire Baltic fleet was assembled, numbering 111 vessels and torpedo boats, when the forts of Cronstadt thundered forth a salute, and announced thus that the ceremony of opening the canal had been performed.

Although it was a leading idea in the mind of Peter the Great that St. Petersburg was to be a seaport, it has never been fully realized till the present day. Cronstadt has been the real port all this time. No vessel drawing over nine or ten feet of water could float over the bar of the mouth of the Neva and reach the capital; all vessels requiring a greater depth of water than this had to deliver their cargoes at Cronstadt. The goods were then put into barges, which were either poled or tugged up to St. Petersburg. All commercial operations were carried on at a great disadvantage under such a mode of operations. This will be best understood by stating that goods can at the present day be sent from London or Hull in about a week, but the transshipment of them at Cronstadt, with the short but slow passage to St. Petersburg, and the delivery there, usually occupied as much as three weeks, at times even more. This will now be all changed; sea going vessels of almost any size will now be able in the future to proceed direct to St. Petersburg by the new canal, at the end of which docks have also been constructed and connected with the railways. Cronstadt is to remain exclusively a port for the naval marine. It will henceforth be the Portsmouth of Russia.

In 1872 Count Bobrinski, then Minister of Ways and Communications, issued a report on the subject of the canal, and a commission was appointed under the presidency of the Engineer Kerbeds to study the question. This led to two projects being evolved. One was produced under the triple authorship of Cotard, Champoulion, and Janicky, and the other by a councillor named Poutiloff. This last was the one finally adopted in 1874, when it received the sanction of the Emperor. It was about three years later before the works were commenced. This was owing to the necessary machinery—such as dredgers, etc.—having to be made in Finland and England, and many of them were damaged and some were lost on their way to the Neva. The whole length of the canal is about seventeen miles. It starts from the island of Goutouieff, on the southern side of the Neva, where the river enters the Gulf of Finland, and it extends westward along the south side of the gulf, terminating at Cronstadt. The canal, after leaving the islands of Goutouieff and Wolnoy, and the low marshy ground known as the Isle des Cannoniers, passes all the rest of the way, which is nearly its whole length, through the waters of the gulf. On this account, instead of calling it a canal, the work might be described rather as the making of a channel through a shallow portion of the sea. At the eastern end a few miles of it had to be embanked, to prevent the deposit of sand and mud, which produces the bar at the mouth of the Neva. The longer portion on the west, which is not liable to this deposit, is simply a channel which has been dredged out, and its course will be indicated by means of buoys. A large dock has been formed on the island of Goutouieff, to which the railways have been connected. As the traffic increases, there is ample space on the islands for the construction of more docks. By the Neva, Schlusselburg on Lake Ladoga is reached, where the vast canal system of Russia begins. This system was another of Peter the Great's schemes in relation to his new capital, by which the city was to be connected with the great rivers of Russia, such as the Marinskaya, the Tichwinshaya, the Wishnevolodjskaya, and the Volga, the last being 2,500 miles in length; these form, with the canals, a communication between the Baltic and the Caspian. The steamers which are sailing at the present moment on the Caspian were built either in England, Sweden, or Finland, and were floated in pieces by the canal and river system from St. Petersburg to Astrakhan.

SIMPLE PUSH BUTTON FOR ELECTRIC BELLS.

Mr. Gosonko, of Kozloff, Russia, sends us the following simple device for a key or push button for electric



GOSONKO'S PUSH BUTTON FOR ELECTRIC BELLS.

bells. A circular piece of wood, A, has formed in it a cavity, in which is placed an ordinary paper fastener, D, which is connected with one of the wires of a bell circuit. A diaphragm, B, of flexible rubber is placed across the face of the wooden disk, A, and has at its center a paper fastener, C, which is connected with the other circuit wire. By pressing the fastener, C, against the fastener, D, the electric circuit is established. In Figs. 3 and 4 is shown a modified form of the device to be attached to the end of the flexible conducting cord. This very simple and effective push button may be made by any one.

A Queer Superstition.

Abram Reed, a farmer living in Beaver township, Pa., cut down a large oak tree on his farm, and in cutting it up he found, embedded in the trunk, seven or eight feet from the ground, a small glass bottle and what had the appearance of a lock of hair. The bottle had been inserted in a hole in the tree made by an auger, then a pine plug was driven into the hole over the bottle, the hair also being held in the hole by the plug. The bottle was corked, and contained a colorless liquid. Over the plug had grown six solid rings of wood, besides a thick bark. There was a superstition among the early settlers, and it is held by many of their descendants, that asthma and other affections could be cured by the victim standing against the tree and having a lock of his hair plugged in it while the hair was still attached to his head. It must then be cut off close to his head, and the afflicted person walk away without looking at it or ever passing by the tree again. While the use of a bottle was not included in this treatment, it is believed that the one with the hair discovered in the heart of the oak tree was put there in the early days of the settlement by some believer in the superstition to cure an ailment of some kind.—*Lumber World.*

The Different Processes of Preserving Timber.

The American Society of Civil Engineers publishes a summary of the report of its committee on this subject, which is to be one of the topics discussed at the next annual convention of that body. The report classifies three principal methods of working, viz.: 1. Steeping. 2. Vital suction or hydraulic pressure. 3. Treatment in close vessels by steaming, vacuum, pressure, etc.

The experience in the United States is given in five tables, comprising the results, more or less conclusive, of 142 authenticated trials or experiments. In each case these are referred to to give the reasons for success or failure, and the lesson taught. The five heads corresponding to the tables are:

1. Kyanizing, or use of corrosive sublimate.
2. Burnettizing, or use of chloride of zinc.
3. Creosoting, or use of creosote oil.
4. Boucherie, or use of sulphate of copper.
5. Miscellaneous, or use of various substances.

Of the first, *Kyanizing*, it is stated that an absorption of four or five pounds of corrosive sublimate per thousand feet, b. m., is considered sufficient, and it would now cost about $6.00 per 1,000 feet, b. m. It is not recommended except in situations where the air can circulate freely about the wood, as in bridges and trestles, but in very damp locations (as for ties when in wet soil and pavement) its success is doubtful. Its cost when first used led to cheating, which for a time brought discredit upon it.

Burnettizing the committee do not consider the best adapted to use where the timber is exposed to the washing action of water (as this removes the preservative); but, on account of its cheapness, it is probably to be preferred at the present time to any other process for the preservation of railroad ties. The Wellhouse, Thilmany, and other modifications of the process aim at making the chloride insoluble, but are yet on trial. This process has been largely and successfully introduced in Germany. Experience shows the life of soft wood ties to be doubled and trebled by its use. Its cost in this country is about $5.00 per thousand feet, b. m., or 20 to 25 cents per tie, and for the latter purpose the committee particularly recommend it.

The work must be well done; but some of the failures were from doing it *too* well, that is, from using solutions of too great strength, thus making the timber brittle. A solution of 2 per cent by weight of chloride of zinc in water is recommended.

Creosoting, or the injection of timber with hot creosote oil in a cylinder under pressure, is considered to be the very best process which has been fully tested, where *expense* is not considered. It is as yet the only one known which is sure to prevent the destructive attacks of the teredo or other marine animals, and to give absolute protection against decay in very wet situations. It is a somewhat expensive process, requiring for protection against the teredo from 10 to 20 pounds per cubic foot of timber, and costing from $12 to $20 per 1,000 feet, b. m. For resisting decay alone a cost of $10 to $14 is sufficient.

The *Boucherie* process, in which green timber is impregnated with sulphate of copper either by *vital suction*, *hydraulic pressure*, or a *vacuum*, when well done, using a solution of 1 pound of sulphate to 100 of water, has proved fairly successful.

Under the head of "miscellaneous," are classed 41 experiments with almost as many substances, sulphate and pyrolignite of iron, lime, resin, oil, tar, etc., but with as yet no commercial success. The general principles laid down are, to select the process with reference to the subsequent exposure. Use *open-grained, porous* timber, for that reason *in general* the cheaper woods. Extract the sap and water to make room for the material to be injected, natural seasoning, except for the Boucherie process, being very desirable. Steaming takes the place of seasoning. Use enough of the antiseptic to insure a good result, and then let the timber dry before using, as its durability will thus be increased. Do not hasten the work if it is to be well done. Protect ties or timber in the track as far as may be from water by drainage. Contract only with reliable parties of established reputation, under a skilled inspector, who must be in constant attendance when the magnitude of the order warrants.

There is at the close a discussion of the question, Will any preserving process pay? This is answered in the affirmative. The chairman of the committee gives a careful estimate in one of the appendices in an actual case in this country; another general estimate is given based on European experience, and three other separate appendices give different methods of examining the question of economy and comparing values. Other appendices (to the number of twenty in all) treat of the general question of destruction and conservation of forests, and give reports of the personal experience of a number of engineers, with methods pursued, apparatus used, etc.

THE use of electric lights on athletic grounds has been tested for a few weeks at Williamsburg, L. I., where the grounds of the Williamsburg Athletic Club are now lighted by electric lamps. By their light games were carried out in the evening.