

AMERICAN INDUSTRIES.—No. 26.

THE MANUFACTURE OF PIANOS AND ORGANS.

The history of the development of the pianoforte reaches back more than a century and a half, and possesses considerable interest on account of the adoption of the instrument in almost every household. The most ordinary of modern pianos, compared with those used by Haydn, Gluck, and other composers and artists of the eighteenth century, are immensely better in tone, in size, in elegance, and in all other respects.

The piano, like everything else, had a beginning, and the history of the class of instruments from which it has been developed dates from the remote time when stretched strings were first employed in producing musical sounds. One of the early instruments of this kind was the ancient lyre, from which the harp, the psaltery, and the dulcimer were gradually developed. The clavictherium, or keyed cithra, was the first marked approach to the piano. It consisted of an oblong box holding a series of stretched strings, which were struck by a plectra of quill attached to the inner ends of the keys. This instrument, it is believed, was first made in the twelfth century.

From the first days of the clavictherium until the invention of the action, in 1711, the instrument was made in many forms, and took on as many different names. The invention of the action, by which hammers are made to strike the wires and fall back out of the way so as to permit the string to vibrate, has been ascribed to several persons, and there is great doubt as to who was the real inventor.

The first pianos manufactured in the United States were made in Boston in 1822, since which time the instrument has been greatly improved and brought to its present state of perfection.

The parlor or cabinet organ, which is the outgrowth of the melodeon, has been perfected within the last few years, and is now made in a great variety of forms, with different stop arrangements, and at prices so low that but few families need forego the pleasure of music in the household.

For many years a few old established houses controlled the business of piano making and selling; but latterly competition has increased, and new modes of doing business have been inaugurated, some of which have been very advantageous to the buyer and user. The largest manufacturer in this country doing business directly with retail purchasers is Mr. Daniel F. Beatty, whose factory we illustrate on the title page. The idea of dealing directly with the users of the instruments is a recent one, which not only benefits the buyer, but the manufacturer also, as it enables the manufacturer to sell a better instrument for less money than he could if agents were employed.

The central view at the top of the page represents Mr. Beatty's new factory, situated on Railroad Avenue, corner Beatty Street, in the city of Washington, New Jersey. The small building in the foreground is the office belonging to the factory. The larger building is the new factory. The building seen some little distance behind the new factory is the Beatty Building, a spacious structure, containing in addition to the hall proper, the office devoted to the extensive business connected with the piano and organ factory. The large building in the distance at the right is Beatty's Factory, No. 3. Samples of the products of these factories are shown in either of the upper corners. We have chosen a few only of the departments of this concern, as space will not permit us to enter into all of the details of piano and organ manufacture.

While the case of an organ is little more than an elegant piece of cabinet furniture, the case of a piano must not only be as elegant and well finished as skilled labor can make it, but it must be very strongly made of the very best of materials to insure its durability. The iron frame, which is to withstand the stress of the wires aggregating many tons, is fitted to the case; the sounding board is also supported by the case. In the assembling room the wires are placed on the pins, the action is fitted, the soft and loud pedal mechanism is put in, and the instrument is turned over to the workman who adjusts the action, then to the tuner, who puts the strings under their normal strain. The strings stretch somewhat; this, taken together with the slight but unavoidable yielding of the frame, soon throws the instrument out of tune, so that it requires tuning again and again. Finally, when it is capable of standing in tune, it is given to the final inspector, who gives it the last touches, which make it a complete instrument.

The organ is so entirely different from the piano in every respect that it requires workmen of altogether different qualifications. The actions—consisting of the keys, the nicely fitted valves, and the delicate springs which hold the valves to the seats—are made in the department shown in one of the lower engravings. It is with the utmost care that each piece is fitted in its appropriate place, and the workman, when he leaves one part to go to another, knows that what he has finished is well and perfectly done. Without this care on the part of the workman there would be no end to difficulties, and the work would never be completed.

The small central figure in the lower part of the engraving represents the room in which the reeds of the organs are tuned and voiced. The workman in this department must not only be a careful and experienced mechanic, but he must have a correct musical ear and a faculty of distinguishing between the shades of quality in a tone. Upon this workman depends all that is pleasing in an organ, as he has it in his power to make the tone soft, sweet, and mellow, or harsh and unpleasant.

Everything in this factory is conducted on a perfect system. None but the best of workmen are employed, none but the best of materials are used, and the most modern machinery and appliances are adopted to facilitate the work and to render it not only cheaper but better.

Mr Beatty's offices are extensive and well appointed. It requires twenty or more assistants to attend to the details of this immense business. The advertising bureau alone keeps a goodly number of persons constantly employed.

The business, started but a few years ago by its proprietor without a dollar, has grown beyond all precedent, amounting at present to several millions of dollars a year.

Mr Beatty was lately elevated to the Mayoralty of Washington entirely without his own seeking. His fellow-citizens chose him. He conducted no campaign, and was not even present on election day, business having called him to New York on that day, and the news of his triumph was telegraphed to his headquarters at the Fifth Avenue Hotel. He bears his honors modestly, and his neighbors testify to his being the same genial, open-handed, free-hearted man as ever, not forgetting to relieve the unfortunate, to give freely to his church, nor deeming it beneath him to preside at Children's Day services in his own church.

The Beatty piano and organ are everywhere known. Mayor Beatty's success has been rapid and complete, and he claims to possess to-day the largest manufactory of pianos and organs which sells directly to the people.

Winter Precautions for Hydrants, Valves, Etc.

On the 1st of November Mr. Edward Atkinson, President of the Boston Manufacturers' Mutual Fire Insurance Company, issued the following to the mills insured in that company:

Many of the yard hydrants and those connected with stand-pipes are of the variety known as Y or branch hydrants, and are not provided with means of draining off the water when the hydrant is closed.

When the fire pumps are used for inspection, or for the drill of the fire organization, water remains in the upper portion of such hydrants as were closed before the pipes were drained; and also forces its way into the upper portion of every hydrant that does not remain perfectly tight under the heavy pressure. The hydrants are generally tight enough to retain this entrapped water, and the hydrant caps prevent its evaporation.

Our inspectors have discovered many instances of broken hydrants, several of broken pipes, and two of rotary pumps injured by the freezing of entrapped water, during the last year; while, undoubtedly, a larger number of similar cases were discovered by those in immediate charge and promptly repaired.

The hazard of a single broken hydrant does not lie so much in the possible deprivation of its use, as it does in the fact that when water is forced into the pipes there is a great risk of the hydrant breaking; and in most mill yards such an accident would tap all the pipes and prevent the efficient operation of the fire apparatus.

The possibility of such accidents can be obviated by opening all the hydrants when draining the pipes for the winter months and closing them afterwards.

It is therefore suggested that each agent shall, either on receipt of this circular or at such other time as he sees fit to prepare for freezing weather, cause all the hydrants of the description named to be opened, the pipes drained, and the hydrants then closed.

Rotary pumps should be emptied, if not submerged, by turning them backwards.

In this connection, we also urge that all left-handed valves and water gates be distinctly labeled, as many cases have been observed where the valves have been broken by an attempt to turn them the wrong way, even in the presence of our inspectors when causing them to be examined; some great disasters have occurred from the mismanagement of such valves both in premises insured by us and also outside of our line of risks.

The want of similarity in the direction of opening and closing valves is a great misfortune that cannot now be remedied in all cases. In several instances mills have been wet down when the fire apparatus has been under test, because the persons in control were ignorant of the right method of opening and closing their own valves.

It therefore behooves the principal manager of every mill to see that every left-handed valve or gate is distinctly labeled and marked with an arrow painted in white to indicate the direction in which it should be opened; or what would be better, where there are only a few left-hand valves in a yard containing many others, to remove them entirely.

Benzoate of Soda.

Professor Klebs, of Prague, announces that the benzoate of soda is the best antiseptic in all infectious diseases. It acts, as the experiments of the author show, very powerfully. It is claimed that a daily dose of from 30 to 50 grammes to a full-grown man will render the poison of diphtheria inoperative. The benzoate is prepared by dissolving crystallized benzoic acid in water, neutralizing at a slight heat with a solution of caustic soda, drying, and then allowing the solution to crystallize over sulphuric acid under a bell glass. Large doses do not appear to be absolutely necessary. Good results may be obtained by the daily administration of about 12 grammes.

AGRICULTURAL INVENTIONS

An improvement in plows has been patented by Mr Charles T. Crook & Logan J. Huffman, of Fort Mill, S. C. This plow has a bifurcated foot for a plowshare that will allow of the raising and lowering of the share at will, and is so adjusted as to prevent the clogging of both foot and plowshare from grass, litter, etc.

An improvement in sulky plows has been patented by Mr Aden K. Munson, of Marysville, Kan. The object of this invention is to provide for vertical movement of the plow beam independent of the sulky, so that the plow will run at a uniform depth, and also for leveling the plow side-wise on uneven ground, and to provide for shifting the supports of the plow beam bodily on the axle of the sulky for adjustment to the size of plow and the desired width of furrow.

Mr Joseph P. Prairie, of Raleigh, N. C., has patented an improved machine for chopping and cultivating cotton. It is so constructed that it may be used for chopping, for chopping and cultivating, or for cultivating alone, as may be desired.

The Fruit of Shrubby Trefoil as a Substitute for Hops.

All who are acquainted with the tall shrub called "shrubby trefoil" (*Ptelea trifoliata*) know that its fruit is bitter, and in odor is almost exactly the same as the hop. In fact the fruit is sometimes used in this country as a substitute for the latter, and for this reason the plant is also known as the "hop tree." In consequence of the ravages of the phylloxera the French are now looking about for new beverages, and, as observed in the *Revue Horticole*, if the destruction of the vine continues there is no doubt that wine must be largely replaced by beer. M. Charles Baltet has discovered that the fruit of the "shrubby trefoil" makes equally as good beer as hops. At a recent agricultural exhibition at Châlons-sur-Marne, a M. Ponsard exhibited a sample of beer in which the fruits of this plant were substituted for hops, and its quality and flavor are reported as being equal to those of the best Strasbourg beer. As above stated, the fruit of the *Ptelea* is sometimes used in the United States as a substitute for hops, but whether it has ever been so used in the manufacture of beer, we are unable to say.

The World's Commercial Marine.

According to the *Répertoire Général*, Bureau Veritas, for 1879-80, the sailing tonnage of the civilized world has decreased from 14,218,072 to 14,103,605—a falling away which shows the decided tendency which now prevails to give steamers the preference over sailing vessels. The total sailing tonnage of Great Britain, which includes colonial tonnage, is 5,584,128, so that considerably more than one third of the tonnage which sails the sea is under the British flag. When we come to steamships, Great Britain takes a still prouder position. The total number of steamers which can be classed as sea-going is 5,897, of which Great Britain has 3,542; and the total net tonnage of steamships is 4,021,869, of which Great Britain has 2,555,575 tons, or about three fifths of the whole. Counting sailing vessels and steamers together, the civilized world has 18,125,474 tons afloat, of which 8,139,703, or not much less than half are under the British flag. Canada occupies the fourth position among nations. The leading nations are Great Britain, United States, Norway, Canada, Germany, Italy, and France.

Artificial Botten Eggs.

Mr. J. Fletcher, F.C.S., recently described a new method of preparing sulphureted hydrogen. The plan is simply to fuse sulphur and solid paraffine in a small glass flask, leading the resulting gas by means of a perforated cork, India-rubber, and glass tube directly into the solution to be tested. The first gases are not sulphureted, but when the mixture has been thoroughly fused and mixed the sulphureted hydrogen passes over abundantly. The advantage of the process is that the moment the flame of the lamp is removed the evolution of gas ceases, and the little apparatus can be laid aside without fear of creating offensive smells. When used again, the gas passes at once when sufficiently heated. There are few precautions to be taken. The mixture is inclined to BUMP when strongly heated, but a few pieces of broken tobacco pipe shank prevent it. Care must be taken that when the lamp is removed and the gas ceases to pass, none of the solution is sucked back into the bulb; it is very easily prevented. A very strong heat should not be applied, as then distillations would commence and the product condense in the tube.

National Exhibitions.

The years 1880 and 1881 will both be marked by two national exhibitions—the one at Brussels, the other at St. Petersburg. The preparations for the Brussels Exhibition, which will be opened next May, are in a very forward state, and the building will be handed over by the contractors before the end of December. The total space at disposal is 66,000 square meters, one half of which will be devoted to the arts and industries of the past, the other half to modern industrial arts and sciences. All the Belgian industries will be fully represented, including those of agriculture and horticulture, and there will be an additional space of 16,000 square meters set aside for a show of live stock. The Exhibition will be fourteen times as large as the one of 1874 held in the Halles Centrales. The Russian Exhibition is also proceeding rapidly, as far as the building is concerned, and the ironwork is being made at the St. Petersburg foundry.

SCIENTIFIC AMERICAN

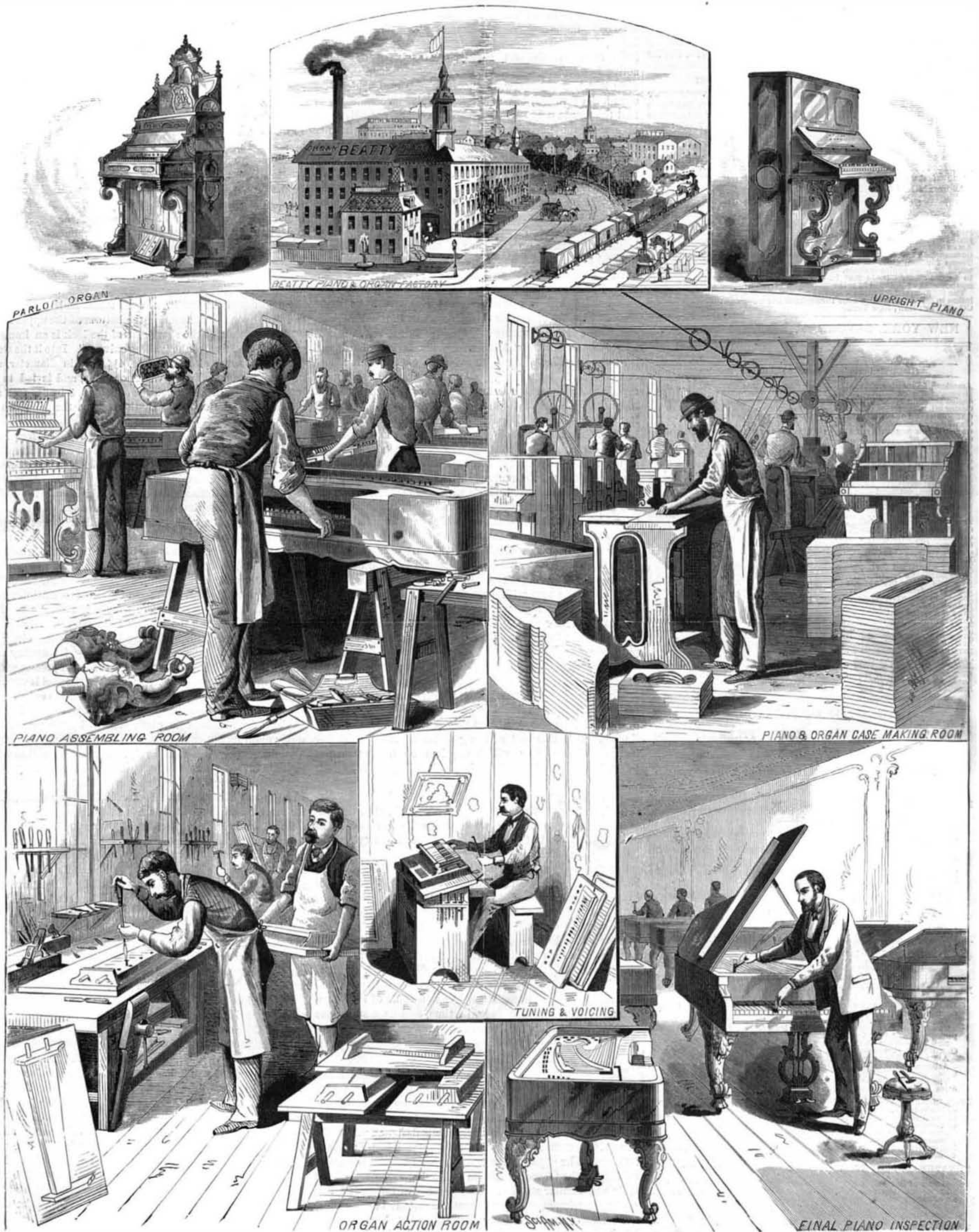
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THE BETTY PIANO AND ORGAN FACTORY.—[See page 396.]