THE GRAMOPHONE.

Making either permanent or transient records of sounds, as exemplified by Scott's phonautograph or Koenig's manometric flames, is no longer a novelty, but recording and reproducing musical sounds and speech are recent. Sound reproducing machines are no less wonderful than sound transmitting apparatus, and, although the talking machine may not find as wide a field of application as the telephone, it is perhaps more interesting and instructive, and has the additional peculiar charm possessed by anything mechanical that faithfully reproduces any of life's actions. If a machine talks, we are apt to regard it as almost human; if it sings, we look upon it as being artistic.

The versatility of the gramophone enables it to embrace almost any sound; military bands, instrumental solos, piano, cornet, clarionet, banjo, etc., songs, recitations, whistling, imitations. Educational features of the instrument are lessons in elocution, lessons on the correct pronunciation of different languages and the memorizing of verses, songs and music.

Some years ago we gave an account of the earlier work of the inventor, Mr. Emile Berliner, in this direction, and our present first page engraving illustrates the gramophone in its latest form. It is presented as a popular instrument for the use of everybody. It affords amusement to people of all ages, and also presents a means of preserving records of various kinds. In Fig. 1 is shown a gramophone provided with the reproducing apparatus only, it being designed for use in connection with records made by the Gramophone Company or the dealers. The instrument is provided with a turntable mounted on a pivot, as shown in Fig. 8, which is revolved by frictional contact with a rubber wheel on the shaft of the fly wheel. The latter is provided with a pulley and is driven by a belt extending around the larger pulley on the crank shaft. On the turntable is placed the rubber disk bearing the record. The sound box is mounted on a swinging arm, which also supports the conical tube or resonator.

Fig. 2 represents the recording instrument operated by a simple electric motor.

The essential parts of the recording instrument are the turntable, the worm screw which guides the carriage holding the recording diaphragm, and the recording diaphragm. The action of the mechanism is to so guide the recording diaphragm, while recording the sound, as to make it trace a continuous spiral line from the outer edge of the table to the center.

The method of making a sound record is to place upon the turntable a highly polished disk of zinc, previously prepared with a film of fat, exceedingly delicate to the touch of a lightly bearing stylus, but dense enough to resist an etching bath.

As the machine is set in motion, a delicately pointed finger or stylus pivoted at its center transfers the wave vibrations from the diaphragm to the zinc surface. The finger moves laterally, and literally writes the sound through the thin film which covers the zinc disk. During the operation the plate is kept soaked with alcohol from the glass reservoir seen in the cut. The object of this is to soften the film and to prevent the particles of film or dust from collecting around the point of the stylus or finger; by this method a true and exact sound wave is recorded.

The record made, the zinc disk is taken from the turntable and the alcohol is rinsed off; the disk is then placed in an etching bath of chromic acid. The length of time consumed in the etching depends solely upon the amplitude of the wave vibrations. Recorded waves of small amplitude receive short etching and those of large amplitude long etching. When taken from the etching bath, the disk is cleaned and is ready for the first reproduction.

Since the first reproduction consists mainly in cleaning out the groove, the sound is at first slightly harsh and grating. Two or three reproductions make the record smooth and quiet.

The record is now ready to go through the duplicating process. A copper matrix is first made by a method of careful electrotyping. From the matrix hard rubber duplicates are pressed nearly in the manner in which castings are made.

The rubber duplicates are superior to the zinc records in several ways. They will bear rough handling and an indefinite number of reproductions, whereas the zinc would burnish and soon wear away. They are louder and smoother than the zinc. The rubber records will stand over 1,000 reproductions, the zinc from 50 to 300, according to their delicacy. A first-class matrix can press out 1,000 perfect duplicates.

A peculiarity of the gramophone record is that it has almost the penetration of the original sound, although not the broadness of tone, so that if 1,000 gramophones could be worked simultaneously, it would be possible for an orator to fill a hall 1,000 times larger than his voice ordinarily would fill. Gramophone recording agencies have been established in Philadelphia and Washington, New York and Boston, and similar ones will be established in every city of importance, where the voices of those dear to us may be permanently recorded.

In Fig. 4 is shown the arrangement for producing the record of a cornet solo. The reproducing sound box, which is shown in Fig. 5, is provided with a diaphragm connected with a spring arm fixed to one side of the diaphragm cell, and carrying a point like an ordinary darning needle point. This point, when the instrument is arranged as shown in Fig. 1, rests in the groove in the record plate and follows the groove as the turntable is revolved. The engagement of the needle point with the groove in the record disk causes the spring arm to vibrate and produce vibrations in the diaphragm, which are the same as those of the recording instrument; as a consequence, the original sounds are reproduced in the resonator of the gramophone with a loudness and clearness which are surprising. The reproducing sound box is provided with a curved damping spring for reducing the vibration of the spring arm when it is desired to connect the sound box with ear tubes to be held in the ear. A cross section of the reproducing sound box is shown in Fig. 6. The manner of holding the sound box in the position of use is shown in Fig. 7. In Fig. 9 is given a much enlarged view of a section of a record, showing the sinuous nature of the grooves. An electric motor has been applied to the gramophone, as shown in Fig. 10, by means of which the table is rotated at a uniform speed, and in Fig. 11 is shown the adaptation of spring clockwork to rotate the turntable.

The type of reproducing machine which seems to find most favor is turned by hand, and as the groove in the record itself guides the sound box, thereby eliminating the necessity of a costly worm screw and intricate gearing, it moves so easily that with five minutes' practice a child can operate it so as to reproduce a band selection or a song in perfect tune. Those who object to manipulating the crank can have a simple motor gramophone that will reproduce the selections by merely turning a switch.

The modest plant first started by the Berliner Gramophone Company, 1032 to 1036 Filbert Street, Philadelphia, has been increased to four times its original size. Duplicates are pressed out by the thousands, showing the rapid growth of this fascinating little machine.

Recent Decisions Relating to Patents and Trade Marks.

Jonathan Mills Manufacturing Company v. Whitehurst (U. S. C. C. A, 6th Cir., Taft, J.) 72 Fed. Rep., 496.

Assignment of Patents.—It appeared that Jonathan Mills made an assignment wherein it was stated that Myron W. Clark had an interest in the patent and there was a postscript as follows: "I hereby consent to the substitution of George T. Smith in place of said Clark in the above agreement, etc., Jonathan Mills." The courts below and above held that this statement was sufficient, after the assignment was recorded in the Patent Office, to put any subsequent assignee on his guard as to the interest of George T. Smith, and that such assignee must be charged with notice of every fact with reference to the company's interest in the patent which diligence and honest inquiry would have developed. It was also held that it was immaterial that the party mentioned in the contract or assignment as "The Smith Purifying Company" was really the "George T. Smith Purifier Company," because it was easy to ascertain whether the name was correct or not, inasmuch as the number of corporations engaged in the business was limited.

Cleveland Faucet Company v. Vulcan Brass Company (U. S. C. C., N. D. Ohio, Severens, J.) 72 Fed. Rep., 505.

Demurrer to Bill in Patent Suits.—Here the patent in suit named other prior patents as showing the prior art, and defendant demurred to the bill on the ground that the patent was void on its face. It was held that the patents mentioned in the patent in suit were not before the court and could not be considered on demurrer. In such case the court cannot apply any special or peculiar knowledge it may possess, but only that knowledge which is possessed by ordinarily well informed people.

Patent for Force and Drain Faucets Void.—The Weatherbee patent, No. 353,723, is void, as there is no invention in merely bending the piston rod of the air pump inward toward the faucet, so that both may be carried through the same opening in the casing.

American Fiber Chamois Company v. Buckskin Fiber Company (U. S. C. C. A., 6th Cir., Taft, J.) 72 Fed. Rep., 508.

Demurrer to Bill in Patent Suits.—It is well settled that the question of novelty and invention may be raised by demurrer to the bill of complainant, that the court may take judicial notice of facts of common knowledge, and it may refresh its recollection as to such facts at the date of application by reference to any reliable printed source of information.

Mechanical Process.—A process of rendering wood fiber paper soft and pliable by moistening it with a thin water solution and then crumpling and pounding it and then smoothing it is not a mechanical process or aggregation of functions, but is a true process.

Fiber Chamois Patent Valid.—The McLaughlin patent, No. 511,789, is valid on its face and the step therein for moistening wood fiber chamois paper with a thin solution of gelatine is not anticipated by a patent which calls for the use of a "suitable size" for a similar purpose.

American Fiber Chamois Company v. Port Huron Fiber Chamois Manufacturing Company (U. S. C. C. A., 6th Cir., Taft, J.) 72 Fed. Rep., 516.

Construction and Infringement of Fiber Paper Patent.—The McLaughlin patent, No. 511,789, for a process for manufacturing imitation dressed chamois and buckskin from paper pulp in sheets, if valid, is limited by the prior art and the original specifications and the patentees' prior Canadian patent to the crumpling and pounding of the paper when moistened with a thin solution of gelatine or other adhesive solution, and is not infringed by treating in a similar manner paper moistened merely with water.

Misconduct of Patent Owner Toward Competitors.—The action of the owner of a patent in harassing purchasers of competitors with threats of litigation when no possible grounds of action exist against them, in attempting to dismiss his bill of complaint and in delaying the taking of evidence until after the defendants begin the taking of their testimony, is condemned.

Heaton Peninsular Button Fastener Company v. Schlochtermeyer (U. S. C. C. A., 6th Cir., Taft, J.) 72 Fed. Rep., 520.

Button Fastening Staple Patent Void.—The Vinton patent, No. 324,053, and the Prentice patent, No. 451,070, have been held void on demurrer for want of patentable novelty apparent on the face of the specification. The Vinton improvement consisted in making a V-shaped joint, the apex of which is located at one side of the center line of the leg of the staple, and which is pressed or flattened and thus made broader than the diameter of the wire from which the staple is produced. The Prentice patent made a slightly different angle between the body of the legs, so as to make the crown portion with a double reverse curve, instead of a single curve.

Richardson v. Campbell (U. S. C. C., N. D. Pa., Atcheson, J.) 72 Fed. Rep., 525

Burden of Proof as to Priority of Invention.—Where the defendant claims that he was the first inventor, although he filed his application after the complainant did, the burden of proof is on him, and he must support his claim of priority by evidence which is clear and free from reasonable doubt.

Garment Hook Patent Valid.—The De Long patent, No. 462,473, is held valid and is construed.

Zwietusch v. Wittemann (Com. of Patents), 75 O. G., 183.

Access to Files and Papers in Interferences.—After the preliminary statements have been received and approved, each party may have access to the files and papers of the other, but if the application contains a description and claims of one or more inventions not related to the one in use in such a manner as to affect its scope or meaning, the opposing party should not be allowed to inspect this part of the application.

Dashiel v. Grosvener (U. S. Sup. Ct.), 75 O. G., 507.

Breech Loading Cannon Patent Construed.—Claim 1 of the Seabury patent, No. 425,584, cannot, in view of the prior art, receive a broad construction, but must be limited to the precise mechanism described.

Prior Inoperative Devices.—Prior inoperative devices or those which have proved so far failures that the inventors have not taken out patents for them, should not be considered as anticipating a subsequent patent. The fact that an invention is patented is some evidence of its operativeness and utility. A device which is not perfectly operative, but can be rendered so by a slight alteration, is sufficiently operative for the procurement of a patent.

Andrews v. Landers, Frary & Clark (U. S. C. C., Conn., Townsend, J.), 75 O. G., 510.

Contract for Articles Containing a Patented Improvement.—A contract to pay for articles of manufacture containing a patented improvement covers all articles of a simpler and less expensive construction than that shown in the patent, made so by the omission of unnecessary details of construction, although they are, in some respects, unlike the patented article. Manufacturers who have stamped articles made by them as patented cannot deny that they contain the improvement set out in the patent.

A CURIOUS case of deception is reported in an ornithological journal. It is said that a person painted seven turtles' eggs and sold them as the rare eggs of the Carolina paroquets, receiving $10 apiece for the doctored eggs. The hand-painted egg was a fraud that surprised the oologists when they learned of them.

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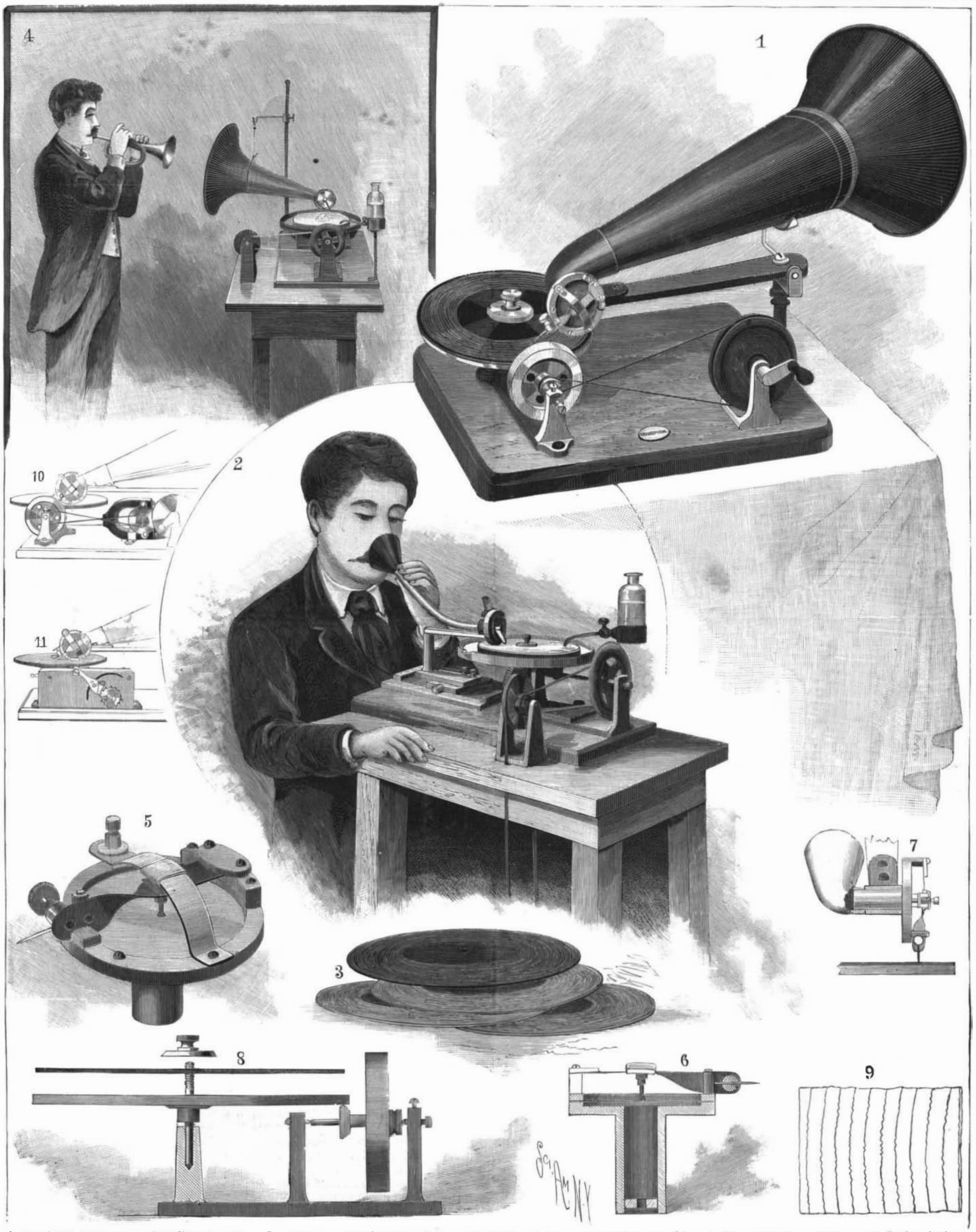

1. Reproducing gramophone. 2. Recording instrument. 3. Record disks. 4. Recording cornet solo. 5. Reproducing sound box. 6. Cross section of sound box. 7. Sound box in position for use. 8. Details of mechanism. 9. Part of a record. 10 and 11. Motor driven gramophone.

THE GRAMOPHONE—THE NEW TALKING MACHINE.—[See page 311.]