

THE PHONOSCOPE

A Monthly Journal Devoted to
SCIENTIFIC AND AMUSEMENT INVENTIONS
APPERTAINING TO
SOUND & SIGHT.

ENTERED AS SECOND-CLASS MATTER AT THE NEW YORK, N. Y., POST-OFFICE

Vol. III

No. 9

New York, September, 1899

Principal Features of this Number

RECENT DEVELOPMENT OF THE ART OF RECORDING
AND REPRODUCING SOUND

NOVEL WAY OF ADVERTISING

THE WAIL OF THE SLOT MACHINE

EDITORIAL

TRADE NOTES

VARIED USES OF THE KINETOSCOPE

LEGAL NOTICES

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OUR TATTLER

NEW RECORDS FOR TALKING MACHINES New Records
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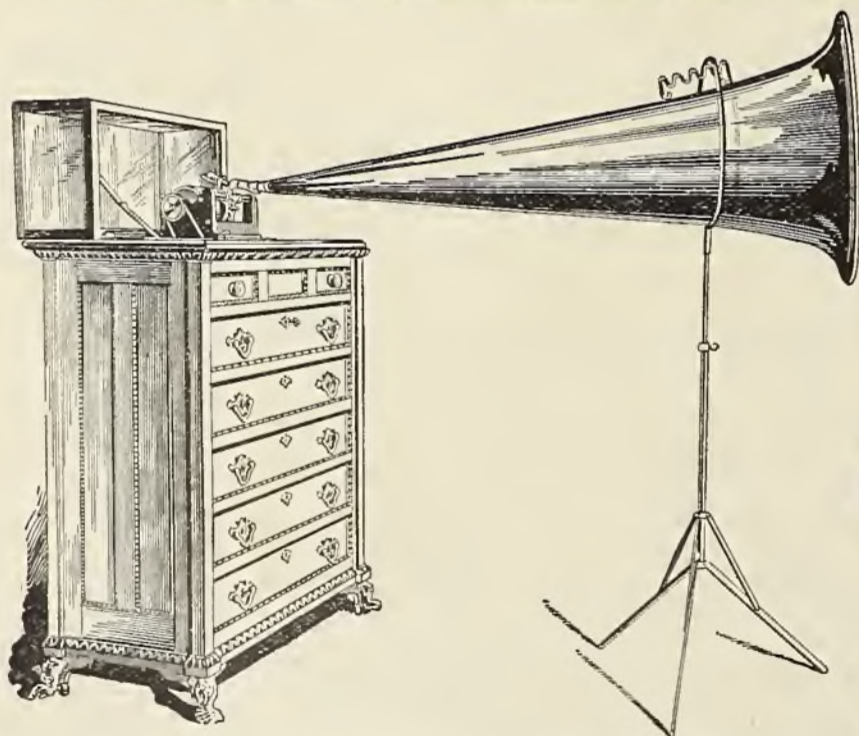
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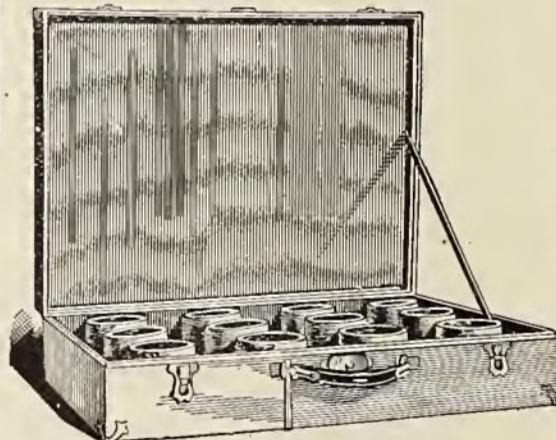
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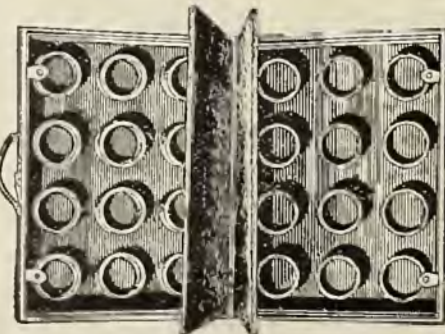
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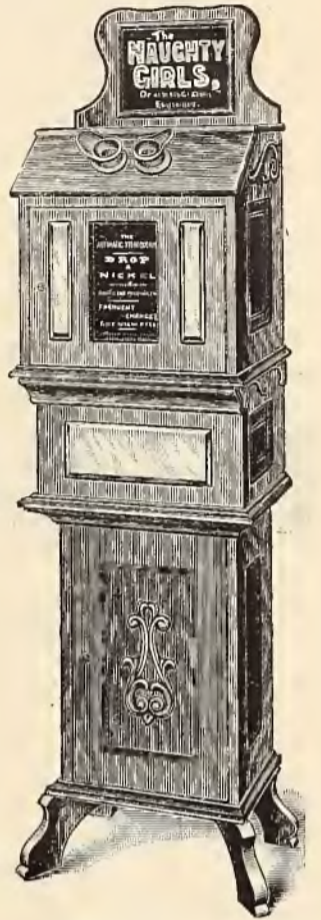
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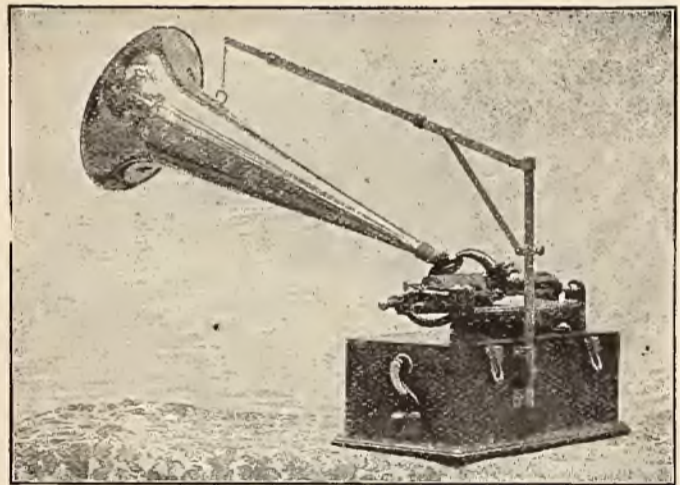
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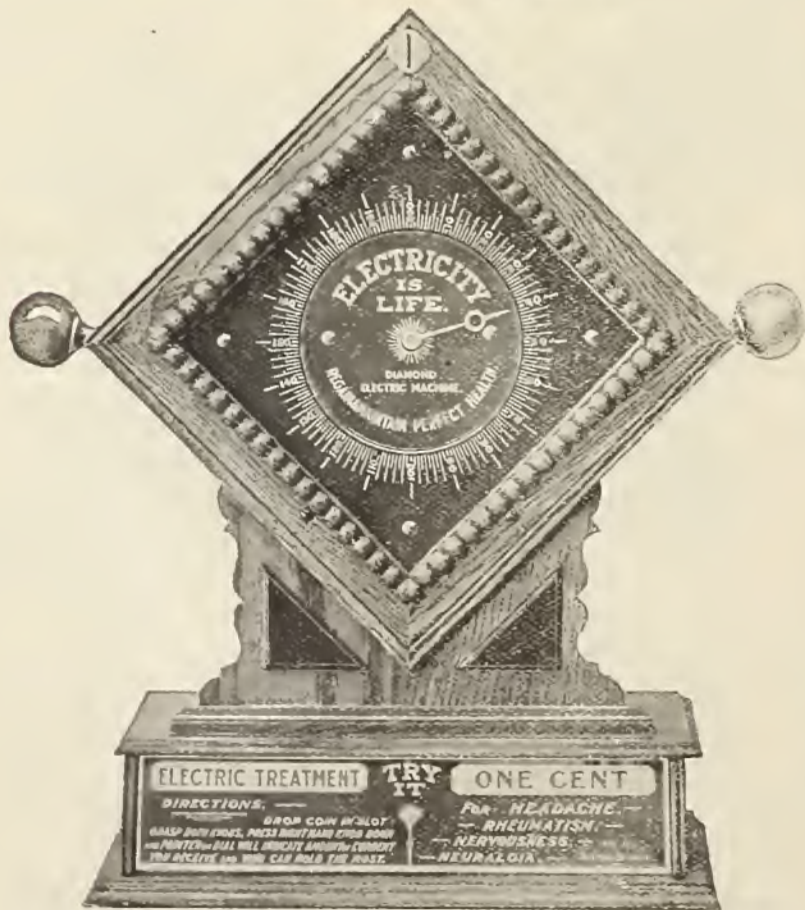
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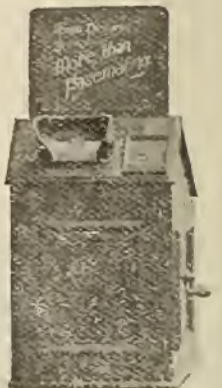
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The Phonoscope

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A Monthly Journal Devoted to Scientific and Amusement Inventions Appertaining to Sound and Sight

Vol. III.

NEW YORK, SEPTEMBER, 1899

No. 9

* Recent Development of the Art of Recording and Reproducing Sounds

In the course of the commercial development of the art of recording and reproducing sounds, a notable result has recently been produced, which is of such a nature as to be of interest to science as well as to industry. It gives me great pleasure to present a brief explanation touching this new departure, so much for the encouragement of science and the useful arts.

The theory of making graphic representations of acoustical vibrations has long been familiar to Physicists, but the practical application of that theory to the reproduction of audible copies of the original sounds was not brought within reach until the invention of the electric speaking telephone, in 1875, by Alexander Graham Bell.

The close relation between the telephone and the Graphophone is obvious, and as a matter of history, it was the existence of the former that suggested the first attempts at the reproduction of sounds from a prepared register of acoustical vibrations.

In the year 1877, Mr. Thomas A. Edison was occupied with experiments looking to the improvement of the telephone and was one day testing with his finger the force of the vibratory movements of a telephone diaphragm. It then occurred to him that the characteristic form of these vibrations might be registered upon a pliable material by means of a point attached to the diaphragm. So far there was nothing original in his thought, for Leon Scott had, many years previously, devised an instrument (known to all physicists as the "Phonautograph") whereby graphic representations of sonorous vibrations could be traced by means of a stylus in a film of lamp black, the stylus being carried by a vibratory diaphragm. But Mr. Edison's mind went further, namely, to the utilization of this registration or "record" to vibrate the same or a similar diaphragm, and thus produce sounds similar to those by which the graphic representation was made. The outcome of this idea was the Tin-foil Phonograph, with which everyone is familiar, and which in the year 1878 attracted much attention and gave rise to great expectations. To describe this instrument would be superfluous, but in order to give to later, as well as earlier events their true significance, one or two facts with reference to it should be noted.

The method adopted was, theoretically, perfect; that is to say, the Tin-foil Phonograph was an attempt to embody the true conception that, if a diaphragm could be made by mechanical means to copy, even on a much reduced scale, the motions performed at a previous time by the same or a similar diaphragm when actuated by sonorous vibrations, reproductions of such vibrations would be attained. This theory was by no means new to physicists; but prior to 1876, no mechanism capable of operating in conformity to it had been devised. What the telephone did for the kindred Graphophonic art in that year was, mainly, to reveal the fact that a very small fraction of the force of the original sound waves suffice to actuate

the repeating diaphragm, and to produce distinctly audible and recognizable sounds.

This was a fact of the most profound significance, and not likely to have been discovered by *a priori* reasoning. The force of acoustical vibrations is exceedingly feeble, and when attenuated by transformation (as in the telephone) into electrical energy, and back again into mechanical vibration, it is difficult, even with the evidence of our senses, to realize that the small residuum of energy conserved to the end of the series of operations is sufficient to give rise to audible sounds. This discovery demonstrated that the vibratory diaphragm could be made to do a certain amount of *mechanical work*, without such loss of energy and without such distortion, as to defeat the object of audible reproduction of the original sounds.

Mr. Edison availed himself of this newly discovered fact in his tin-foil indenting Phonograph; and the desired and expected result was realized to the extent that sounds *were* produced with *sufficient loudness to be audible*; but disappointment was met in the fact that, somewhere in the series of operations, the characteristic *forms* of the vibrations were so lost or distorted that the reproduced sounds were but caricatures of the originals, and the reproduction of the recognizable spoken utterance was not realized to a useful extent.

The questions how, where and why this loss and distortion occurred, were extremely difficult of solution; and the literature of the subject, at that time, reveals no attempts to analyze or explain the result. At a much later day, and in the light which subsequent discoveries threw upon the subject, it became possible to understand why the Edison method of indenting or embossing a pliable material was and is incapable of accomplishing its intended object. The defects were of several sorts, but it is sufficient for our purpose to notice the main cause of failure, which was inherent in the method itself and quite independent of its mechanical embodiment.

For theoretical success this method required that the recording material be *perfectly mobile*, and capable of yielding, like a liquid, to all the complex movements of the recording stylus. On the other hand, in the operation of "reproducing," the material is required to have *sufficient rigidity* to actuate the stylus and diaphragm. Hence, the better material answered to the requirements for *making* the record, the more unfit it was for *reproducing* the recorded sounds.

The failure of the Phonograph was so pronounced as to discourage effort in the same direction for a long period of time. From 1879 to 1886 the literature of the art reveals no serious attempt to accomplish the reproductions of sounds, and no advance whatever was made during that period. Those were the seven years of famine in the art.

I have shown how, in one sense, the Graphophone resulted from the telephone, I have now

to show how this was true in another and quite different sense.

One of the acts for which the Emperor Napoleon I, is commended even by his severest critics was the institution of the Volta prize, to be awarded by the French Government, upon the recommendation of the French National Academy of Sciences, for discoveries of great importance in electrical science. This prize was awarded in 1880, to Mr. Graham Bell, for the discovery of the telephone; and he conceived the happy idea of appropriating the money, part of the award to forming an association whose serious work should be the advancement of acoustical science. To this association, composed of himself, Dr. Chichester A. Bell and Mr. Charles Sumner Tainter, he gave the name "Volta Laboratory Association," in commemoration of the award.

The associates labored earnestly from 1881 to 1885, and as the result of their labors made many valuable contributions to science. Foremost among these was the method of recording and reproducing sounds, now in universal use, by *engraving a solid material of amorphous character*, such as wax or wax-like compositions. This system as a whole embodied many discoveries and inventions which contributed to the desired end and which cannot be referred to in detail within the limits of our available time. To mark the contrast with the embossing process it will suffice to notice (1) that, in the engraving method the point of the stylus, which is a veritable graver's tool, is constantly *embedded in* the recording material, instead of merely *pressing on its surface*. Hence it acts constantly, as well during the backward as during the forward movement of the diaphragm, producing a *continuous* record without skips or breaks; (2) that the stylus removes the material by cutting it away, instead of merely displacing it, and that it does not disturb the material except at the *exact point of contact*; whereas the embossing stylus produced a depression and disturbance extending over a considerable area around the point of contact; (3) the engraving method resulted not only in accurate and recognizable records, but in records that could be *removed from the machine*, handled and transported without detriment, and which could be used scores, indeed hundreds of times. This last mentioned characteristic of the new Graphophonic sound-record is of the very first importance from the industrial point of view. Such was the Graphophone as patented by Dr. Chichester Bell and Mr. Tainter in 1886.

Thirteen years have now elapsed, during which this great discovery has passed from the laboratory to the factory, and has become the foundation of an important industry. *The incentive to improve the operation has induced inventors in large numbers to attempt it, and capitalists to lend their financial aid. Yet, save in details of mechanism and refinements of various sorts, everything remains as Dr. Chichester Bell and Mr. Tainter left the system in 1886.* The main

effort during this period has been for *greater volume of sound*. In this direction the art has been painfully struggling for many years, and the results have seemed to indicate that a practical limit had been reached.

But within a few months a new development had taken place, which produces results in volume of sound and in fidelity to the original, far exceeding the limits of what was previously, and by those best able to form an opinion, deemed possible.

What is of peculiar interest in this connection is the fact that the result in question is produced by an apparently slight variation from previous practice, and the attempt to trace the observed result from the apparent cause will form the concluding portion of my remarks.

It is appropriate at this point to offer a practical demonstration in order that your ears may judge of the extent of the advance that has been made. I shall first show the result that has been attained by the standard Graphophone, and from which a comparison can be made.

(A demonstration was here given, using a record made by the old process and one of the same selection made by the new process.)

The difference observable between the two machines before you (overlooking unimportant details of construction) is that the cylindrical tablet of the loud-sounding machine is *larger* than that of the other. No one in this audience will for a moment suppose that the volume of sound is in any way affected by, or dependant upon, the *size* of the recording tablet. It would be as reasonable to suppose that characters written on a large piece of paper would be visible farther than characters of the same kind written on a small piece of paper. The other mechanisms are substantially the same in the two cases; that is to say the same recording device is used, the same material for the tablet, and the same reproducer. The difference is that the recording tablet of the "Grand" moves with a *surface velocity of from two and a half to three times that given to the small tablet*. The former is made large because, for practical reasons, it is preferred to obtain the high surface speed by increasing the diameter of the tablet rather than by increasing its axial speed.

The known conditions, therefore, lead us to inquire how the mere increase in speed can bring about so remarkable a result? Superficial consideration would indicate that such change in operation could only have the effect of producing a corresponding elongation of the undulations; and in order to see a logical connection between the cause and effect we must observe, a little more closely, the conditions under which records of sounds are made and reproduced.

An important factor here is the *resistance* which the substance of the tablet offers to the action of the cutting style, which will conform absolutely to the movement of the acoustical vibrations only if absolutely free and unimpeded. This resistance is very slight, owing to the properties of the substance employed, which is an insoluble soap, and to the fact that a very sharp jewel point is used, whose normal penetration is not much more than one thousandth of an inch, so that the style has to cut away an exceedingly small amount of material having very slight cohesion. When the speed is increased a proportionately greater amount of material is cut away in a given time, *i. e.*, more work is done and more resistance overcome, during the period occupied by the utterance of a given sound. It would appear to follow that increased velocity does not diminish the resistance to the movements of the style, but just the reverse.

The factor of resistance, however, has had an influence in determining the angle of inclination

of the style to the recording surface and the shape of the cutting point. The latter is formed by a small cylinder of sapphire cut off in a plane nearly at right angles to the axis, so that the cutting edge is approximately an arc of a circle. With such a cutter the resistance to its action would be greatest when it operates in a position normal to the recording surface, and least when placed tangential thereto. This theoretical position of least resistance is, however, inadmissible in the operation of recording sounds. In this operation we have two movements to consider. The first is the straight ahead movement of the tablet which results merely in the removal of the material in front of the cutting point and the formation of a groove. If the stylus were stationary during the operation it could manifestly, and with great advantage, occupy a position almost tangential to the cylinder. But there is a second and all important movement, namely, that due to the vibrations of the diaphragm, which movement is substantially radial of the cylinder. It would be manifestly impossible for the stylus to perform this movement at all if it occupied the ideal tangential position, for that would imply forcing the stylus side-wise into the hard body of the tablet, a task far beyond the strength of the feeble sound-waves. In practice, therefore, the stylus has been inclined at an angle of about thirty-five degrees to the tangent at the point of contact.

Under these conditions, what takes place in the operation of making a sound-record may be roughly described as follows: the cutting stylus, performing its pendulous motion corresponding to the sound waves, cuts a sinuous line, composed of alternate elevations and depressions. As the cutting edge begins to descend to cut a depression it at first encounters practically no resistance, the sharp edge alone being in contact with the material of the tablet; but as the movement continues the crest just being formed by the descent of the cutting edge comes in contact with the shank of the cutting stylus, that is the smooth cylindrical surface forming the periphery of the stylus. As soon as this occurs a check is imposed upon the further penetration of the stylus, which is no longer free to follow the movements of the atmospheric impulse. The effect of this check or damping influence is not merely to diminish the penetration of the stylus, but also to modify to some extent the form of the undulations.

The effect of increasing the velocity of the recording tablet will now be easily understood. If that velocity be made sufficiently great the crest of the undulations as they are formed, are, so to speak, carried away so rapidly that they do not come in contact with the shank of the stylus at all. More exactly stated, the descending slope becomes very gradual as distinguished from a very abrupt one, the curve approaching more nearly to parallelism with the recording surface. It follows that the resistance or check being removed, the stylus will penetrate to a much greater depth than formerly, and will form undulations of much greater amplitude. The volume of sound being dependent upon the amplitude of the vibrations, the increased volume of sound is thus accounted for.

Methodical experiments have shown that, beyond a certain critical speed, there is no gain either in loudness or quality, but that, on the contrary the results deteriorate upon further increase of velocity.

The improvement in quality resulting from this new method is apparently due to the fact already stated, namely, that the diaphragm and cutting stylus are at all times free to move in accordance with the acoustical vibrations. The test of the ear convinces us that the records made by this

process correspond very closely to the form and amplitude of the actuating vibrations. But in all probability they correspond more closely than that test would indicate, for the conclusiveness of that test would imply a perfect-acting reproducer. It is appropriate, therefore, to notice the construction of the reproducer and the conditions under which it operates. It will appear from this examination that the operation of reproducing the recorded sound is materially affected by the invention under discussion.

The reproducing stylus has an end of spherical curvature which rides in the record groove, being automatically held therein by the weight of the mounting of the reproducer, which is supported on a universal joint.

The object sought is to give to the device such weight that the stylus will at all times rest in the record groove and follow accurately the undulations thereof. With the low speed record it could not do this. The crests, when very close together (as in high pitched sounds) did not afford the point (which must have a relatively large area in order not to cut the record) opportunity to descend fully into the intervening depressions. Moreover, when an abrupt ascending slope impinged against the reproducing point, the effect was that of a blow, throwing the point away from the record and causing an interruption of the operation. With the gentle slopes and wide curves of the high speed record this irregularity is largely eliminated, and we approach much nearer to the theoretical condition for perfect reproduction, namely, that the diaphragm should be at all times controlled by the sound-record, and should move in strict accordance with the form of its undulations. Not the least remarkable and interesting fact connected with our subject is that the discovery of a relation between the velocity of the recording material and the volume and quality of the reproduced sounds has so long escaped attention. It appears strange indeed that, with so many observers, and with so strong an incentive to increase the volume of sound, this simple law has not sooner been discovered. It seems, however, that variations of speed within ordinary limits produce no noticeable difference and obviously, other things being equal, it is desirable to use as low a speed as practicable and thus obtain a record of maximum length upon a surface of given area.

*A Paper Read before the Franklin Institute, Wednesday, March 15, 1899, By Philip Mauro, Counsel for American Graphophone Company.

Novel Way of Advertising

Working Street Car Fender Shown in a Mutoscope

A Boston man has hit upon a novel way of advertising a street-car fender which the Hipwood-Barrett Company is introducing in the West, from a Chicago branch office. He carries a Mutoscope around with him, catches a street-railway man, and makes him put his eyes to the peek-hole. Then he turns a crank and the street-railway man sees the fender in the act of picking up two dummy figures on the Newton-Boston electric tracks. The smaller dummy weighs thirty pounds and lies across the tracks; the larger one, fifty pounds, stands upright with its back to the rapidly approaching car. The fender does its work in great shape; the exhibitor explains that the small dummies are much harder to pick up than real men, and the street-railway man has to believe the evidence of his own eyes as to the merits of the fender.

The Mail of the Slot Machine

There is nothing unusual about my appearance as you will admit. In fact I am quite an ordinary machine with no more complications in my insides than a fellow usually has who knocks about saloons and keeps bad hours, as I have done these three years. But still there has never been anything so serious the matter with me that the doctor could not fix it without resort to other instruments than his fingers and a small screw driver. You know I call the young man who comes around and takes the nickels out of me, the doctor, and he calls me his good patient, and says that I pay handsomely for attendance, except when I'm in jail.

I have been acquiring modesty for three years, so I say now, what I firmly believe, that I am only a common sort of a slot machine with four compartments and a rake-off box. My exterior is yellow oak and the rest of me is hard maple. I have nickel trimmings, as is fitting and my face is covered by a piece of glass.

I used to be a pretty fine piece of furniture and when I began my public career I was a great curiosity. I stood on the tiled floor near the entrance of a big saloon and was admired and played by every one, my winsome appearance causing many a nickel to be left with me. I was decently honest too at that time although I was tempted often. But lately my associations have been so bad—worse than I ever could have selected for myself, as I told a policeman only this morning—and I may have lapsed from rigid honesty, but still no man can say that I ever did a dishonorable act and I have always gladly given the house at least 40 per cent. of my gross receipts.

Of course three years ago I was green. I was proud of the beautiful work I was doing and nothing delighted me so much as when my owner patted my polished sides and said:

"He's good for \$10 a day, six days in the week and \$15 on the seventh."

It was all too good to last. I know that now.

My first rebuff came when I had been in commission about three months and I have never been the same since. It happened this way. Early one morning I noticed a man with a hooked nose and a big mustache come into the saloon. The bartender with the yellow hair was polishing up the glassware and getting ready to mix matutinal cocktails. The man with the hooked nose looked slyly around, smiled and winked. He turned a glass of bitters into himself, where I have no doubt they found similar society to themselves. Then he winked knowingly at the bartender, jerked his thumb over his shoulder toward me, pointed straight down with his other hand and went out.

The bartender stood for a moment lost in thought. Then he called the porter and together they seized me and carried me down stairs. I was scraped some, but they hustled me along and placed me in the darkest corner of the cellar. They threw a piece of burlap over me, piled a lot of empty wine boxes around and went away, leaving me disheartened and disconsolate.

But I kept mum, feeling sure there was need of silence and I proposed to be faithful to my owner. At the end of a week I was feeling mighty lonesome and pretty sick. It was damp down there and the moth and rust were corrupting. My joints were soon affected and I knew I'd need a pretty thorough course of treatment if I wasn't taken out soon. Just when I was feeling the worst about it all and wondering if my owner had gone back on me completely, I happened to look toward the partition that separated the room where

I was from the back one where the stairs were. The door opened and the colored porter came in with a lantern in his hand.

He stumbled forward, groping about until his hand clutched the burlaps that covered me all but one crack, through which I could see. He yanked the covering off and looked me over carefully, holding the lantern at arm's length. Then he placed the lantern on the damp floor, drew three nickels from his pocket, and came nearer.

"Yellow wins suah after midnight," he said, as he dropped a nickel into me and pulled the lever down. I didn't feel much like moving on account of the rust, but I did finally, and I disproved that statement about yellow being a sure thing after midnight. The other nickels were dropped into me and I felt better. Then I saw that he had no intention of losing his three nickels. He produced a screwdriver, turned my face to the wall and attempted to get at my cash compartments.

"Thief," I muttered, as he jarred me and the wheel in my head whirred.

"What's that?" he exclaimed, drawing back. "I thought I heard some one speak."

But he did not give up. He pried with the screwdriver until I thought my back would break. It would, too, if I hadn't resorted to strategy. He gave me another jolt and my wheel started again. He at once turned my face out and waited. I stopped on yellow and forty nickels dropped in a shower in the cup. With eager hands he drew them out. He counted them carefully and put them in his pocket. Then, being colored, he thought better of it. He gave me a vigorous shake and the nickels in my other compartments rattled. He got a box, placed it in front of me, sat down and began to play. He had forgotten all about his screw-driver.

Well, it was relaxation for me and he showed he was a sport. He said to himself it was one against one, but gracious! he didn't know. He had no chance. In about two hours I had those nickels all back and when he left I could see that it was daylight in the back cellar.

I had a good round and I felt easy and comfortable inside again. The next night he came back and I got six nickels from him. The next night I got nine more and in three weeks he won only twice and I let him do it; once he carried away three dollars because he said he needed the money, and another time I let him have a dollar and a half because he seemed to be discouraged and I feared the screw-driver.

I think it was on the twenty-first night that the end came. He appeared as usual about midnight and I saw at once that something was wrong. He had but three nickels and I thought I'd make short work of him. Before he began to play he sat down, drew a bottle of whiskey from under his coat and took a long pull at it. Now, while I've knocked around saloons for three years, I have never got so hardened I could stand for that. I'm a good gambler, and that's bad enough, but I don't drink and no good gambler does.

Well, he placed the bottle on the box and staggered toward me. I was completely disgusted. This colored man had been good to me and I had intended to give him all his money back, but, as I said, I couldn't stand for his lushing, so I swallowed his first nickel and kept quiet.

"Dog gone 'f I believe that old wheel moved at all," he said, as he gave me a hearty slap. I maintained my composure and swallowed his other nickels.

"I doan' believe," he began, and gave me a kick to finish the sentence. I trembled with rage and pain and resolved to get even.

He took another drink and hurried up stairs. He came back soon with a handful of nickels.

"Aha," I said. "The bartender left the till open."

I swallowed his nickels in less than fifteen minutes and never gave him a cent back, knowing he had stolen them.

He went up-stairs again after he had taken another drink and when he returned he was carrying the cash register. Now, I always did hate cash registers. They're so stuck on themselves because they can add figures, but there isn't one of them that can tell a lead slug from a nickel, so I never could see where their aristocracy came in. I was pretty glad when he took that register and pried it open with the screw-driver.

There wasn't much money in it, but he cleaned it out, putting some quarters and halves in his pocket and laying the nickels on the box besides the whiskey bottle. He seemed pretty shaky when he had done this and took another drink to brace himself up. He fed me the nickels and I took care that he did not win. Then he went at the bottle again and finished it.

I could see daylight through the door which he had left open. I wondered what he was going to do when I saw his head drop forward and he went to sleep with the bottle clutched up to his breast and the rifled cash register and the tell-tale screw-driver beside him.

Half an hour later I heard a step up-stairs. Then there was a hastening and bustling. A step on the stairs followed and pretty soon I saw the face of the blond bartender in the door and a big policeman was peering over his shoulder. They came forward and struck a match. The story was plainly told by what they saw. I heard the rumble of a wagon and the clang of a bell above and another policeman came and helped the first to carry the limp Simon away.

An hour later the detectives came. My owner brought them down stairs and I tell you I was glad to see him.

"He'll know where I am now," I said to myself "and he'll get me out of this."

"Who runs that slot machine," asked one of the detectives with a knowing leer.

"I don't know," answered the proprietor.

I could hardly believe my ears. I know I blushed. It took me months and months to get over that shock and I have been a different machine ever since—an outcast, without family, friends or connections. I had been disowned, cast off and driven from home. It was something that I thought about as the detectives loaded me into the wagon and took me away. A. D. W.

A film for picture machines which is acknowledged by exhibitors to be the funniest of all moving magic films is termed "A Visit to the Spiritualist." A countryman is seen entering the office of the Spiritualist and paying his fee. He is then mesmerized and sees funny things. He drops his handkerchief on the floor and as he reaches for it, it gradually grows larger and larger, dancing up and down and going through funny antics until before the eyes of the spectator it turns to a ghost of enormous proportions. It then vanishes and as the countryman is in the act of sitting in a chair the ghost suddenly appears and the countryman receives a great fright. He then jumps up, throws off his hat and coat and they immediately fly back on his body. He repeatedly throws them off and they as often return. The scene closes by numerous ghosts and hob goblins appearing and disappearing before the eyes of the frightened countryman who finally leaves the room in great haste.

The court having adjourned until after January 1, 1900, no decision has yet been rendered in the suit of the American Graphophone Company, vs., Leon Douglas, et al.

THE PHONOSCOPE

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THE PHONOSCOPE is the only journal in the world published in the interest of Talking Machines, Picture Projecting and Animating Devices, and Scientific and Amusement Inventions appertaining to Sound and Sight.

Correspondents in London, Paris, Berlin, Amsterdam, Madrid, Alexandria and Constantinople, Australia, South America, Central America, Canada and 108 cities in the United States.

The Publishers solicit contributions from the readers of THE PHONOSCOPE, and suggest that any notes, news or items appertaining to sound and sight would be acceptable.

On more than one occasion our attention has been directed to the unscrupulous methods employed by a journal which is published in this city, and as a protection to our advertisers and subscribers we deem it our duty to bring to their notice the following facts:

We are the recipients of an extensive correspondence but have never found ourselves, through haste or otherwise, reading the contents of a letter addressed to any one else. It is, we agree, reasonable to expect an occurrence of this nature, but it indicates a peculiar force of circumstance when this is repeated and when these letters fall into the hands of persons so directly interested.

A recent communication informs us that a letter intended for us containing a request for advertising rates, etc., has in some mysterious manner been received and answered by the company controlling the said journal. As a natural result, we are informed, the company mentioned refused to enter into any negotiations with these over-ambitious people.

We will cite another instance which for audacity and barefacedness even surpasses the above:

A letter very plainly addressed to THE PHONOSCOPE PUBLISHING COMPANY was, in the same strange manner, received and opened by our contemporary, notwithstanding the fact that the name of our editor, Emil Imandt, was equally legibly written on the envelope. This letter, however, eventually reached us, sealed by the Post Office Department marked "opened by mistake." As it contained an order they were in duty bound to return it or suffer the consequences of a clash with the Post Office officials, who may not prove to be as leniently disposed as we have been.

We do not see how anyone can conscientiously resort to such practices and expect to establish sufficient confidence with our clients to secure their patronage, and despite our ruffled feelings, extend our sympathy for the sad conditions which necessitate such procedures.

Now, we have never borne any animosity toward this journal; in fact, we are led to believe that very few have taken this publication seriously, and we have heretofore totally ignored their customs and business methods. We are not averse to competition when legitimately entered into and conducted, thoroughly appreciating the fact that it is, in the political economy of commerce, the great motive power of production and enterprise,

but we are now more than ever confident that their existence will never have any material effect upon our aspirations and we trust that our readers will not misconstrue the object of these words.

We take advantage of this opportunity to strenuously object to this treatment and unless they desist the practice of these base methods it shall become our painful duty to invoke the aid of the law on the next provocation.

* * *

Rumors of Patent litigation are flying thick and fast. A suit is impending between two of the most prominent talking-machine companies which will undoubtedly prove very interesting. The lawyers are all rubbing their hands in anticipation of fat fees. In matters of this kind success generally waits on the one with the largest purse and the inventor who would attempt to market an improvement on any style talking-machine, as matters now stand, is in a good way to lose all his money trying to protect his developments from the rapacity of those who have money to engage legal help to throw obstacles in his way. This is surely getting to be a government by injunction.

* * *

We understand from reliable authority that a certain New York department store known as rate-cutters have a carload of Phonographs in their top floor waiting the Christmas trade. What sort of protection is this to the dealer who has not sufficient capital to do likewise?

* * *

The following extract appeared in the November issue of the *Gramophone Record*:

A WORD TO THE TRADE.

The recent appearance of circulars and advertisements put out by pirates who are endeavoring to break into the talking-machine trade with an apparatus using "hard flat, indestructible" records, does not, in our judgement, render it necessary for us to add anything to what we have already said on the subject of infringing mechanisms.

We will not insult your intelligence by any further exposé of these people. We have entire faith that your own business perspicacity, and the confidence which has grown out of dealing with us and in our goods, will certainly lead you to feel that so long as you confine your dealings in our style of talking-machines to us, you are safe from all patent or legal complications.

NATIONAL GRAM-O-PHONE CORPORATION.
November 10, 1899.

* * *

In a certain patent suit now pending on duplication, the defense are using the novel argument that with the sale of every blank goes the right to make on that blank a record by any means whatsoever. This is not only good logic, but good law, as a blank is sold for no other purpose than to make a record. If the court sustain this opinion in the final decision it will mean the opening up of the duplication patents in the United States.

* * *

We understand that one of the large Phonograph dealers of Brooklyn, N. Y., has recently been excommunicated by the "Pope" at Orange, N. J. If these Papal Bulls continue to be issued it will not be long before one-half the dealers in the United States will be without the fold. There is a movement on foot already among the ex-communicants to organize in their own interest a central purchasing depot for their protection. As they include some of the largest and strongest interests in the talking-machine trade, doubtless this fraternity will continue to be heard from,

Trade Notes

C. E. Stevens returned from a prolonged business and pleasure trip abroad November 21.

Lieutenant G. Bettini returned from Europe November 25, after a successful business and pleasure tour, during which he disposed of his French patents.

Mr. John Anman, one of the directors of the Edison Bell Consolidated Phonograph Company, Limited, of London, sailed for home on the "Oceanic," November 14.

Genial Leon F. Douglas, of the Polyphone Company was in New York recently. He reports a rapidly increasing demand for the improved attachment and difficulty in filling their orders.

The Automatic Stereoscope Company have opened a handsome exhibition parlor on upper Broadway which is conducted under the management of Mr. B. Moore, who hails from St. Louis, Mo.

The Greater New York Phonograph Company are doing a phenomenal business. They are kept busy supplying the increasing demand for their Adjustable Horn Crane and Chemically Prepared Linen Fibre Diaphragm.

H. H. Wetzel, known to the trade as the Omaha Phonograph Company, put up his blinds on October 18. A few people would like to have his present address. Boys, it's Europe, but don't tell anyone we told you.

A Russian came to this country with 800 Russian master records, which he hoped to sell to the American public. He returns with his records and wonders why Americans do not like Russian music as well as Russians do American.

F. M. Prescott reported October as his largest month's business this year and now says that November will be larger than October. He is rapidly building up as large an export Gramophone business as he did for the Phonograph.

J. C. Henderson, of Washington, D. C., who for the past four years has been connected with several offices of the Columbia Phonograph Company, has accepted the position of assistant manager of the Columbia Graphophone Company, of Omaha, Neb.

The National Phonograph Company has issued a net cut-rate price list to the trade on horns, carrying-cases, etc., dated November 15. We are somewhat surprised as the National Company have ostensibly been opposed to rate cutters. We suppose, however, that they are not infallible.

The Electroscope and the Imperial Picture Machines as placed on the market by The American Electroscope Company are meeting with a great sale especially in foreign countries. These machines for simplicity and practicability are excellent. The demand for pictures exceeds the present output.

The Edison Phonograph Works are making large additions to their blank plant which at present cannot supply their own demands. They are also building a new factory for the manufacture of records and another new building is being erected for the manufacture of cabinets and packing boxes.

The Concert Grand Phonograph is used to do the singing of illustrated songs in Newark, by The Original Exhibiting Company, and has met with great success at Black Prince Hall. The people complained that the orchestra did not play long enough, so the Phonograph was substituted to do the work, which met their entire satisfaction.

It is said that there are now pending some forty suits for infringement of talking-machine patents. The legal departments of some of the prominent companies must cost a considerable sum in the course of twelve months. As all the broad patents on talking-machines expire in 1903, we anticipate some lively prices after that date.

The genial Chas. H. Webster, formerly associated with the New England Phonograph Company, of Boston, The Vitaphone Company and manager of the International Film Company, is now connected with the Film Department of the Edison Manufacturing Company, New York, where he will be pleased to meet his many old patrons.

The National Phonograph Company have secured spacious quarters in New York City which is being fitted up as a laboratory for recording high-class operas for the Grand Phonograph. The rooms are without a doubt the cosiest and most artistically furnished in the talking-machine business and includes a reception room for the convenience of artists which is superb.

Messrs. Harms, Kaiser & Hagen are now making records by a new process, which greatly excels those made heretofore. The fact that they are making a special feature this month of zither records should increase their orders to a great extent, as no collection is complete without one of them. Send in your orders and convince yourself as to the merits of these records.

The Columbia Phonograph Company offer the latest talking-machine, a sort of toy Gramophone with small wax disks, on which the sound box travels from the center to the circumference instead of vice-versa as in the real Gramophone. Not having heard the machine we cannot venture an opinion as to its merits. It will sell for about \$3.00 including five disks.

The following changes in the personnel of the Columbia Phonograph Company have been made: Mr. W. E. Fisher, manager of the Baltimore office, is ordered to European service. Mr. James P. Bradt, assistant manager of the Philadelphia office, has been appointed manager of the Baltimore office. Mr. Cortland B. Shaw, of the Chicago office, has been appointed assistant manager of the Philadelphia office.

A new use has been found for the Phonograph. Sir Redores Butler, the English General in Chief in command of the forces in South Africa, is using one in his campaign against the Boers, to study the "Raad Dutch" which is the language of these doughty burglars. We should think this faithful instrument would be sorely tried in attempting to catch some of the queer names of their country which we read in the daily papers.

H. H. Meyers, for years manager of the Ohio Graphophone Company, of Columbus, O., in June sold his birthright in the talking-machine business in Ohio. After three months' retirement he could not resist the fascinations of the business and has re-entered the work by opening the Columbia Graphophone Company, of Omaha, Neb.

He has fitted up the largest and handsomest store in the Northwest and the trade is showing its appreciation of an up-to-date stock by their liberal patronage.

Jos. W. Stern & Company, have proved again their enterprise and their determination to serve musicians and the music trade in every possible way. Their latest departure is the introduction of the "Markstern" Brand Music Paper, a fine supply of best imported stock, perfect in ruling and finish and which is most popular in price. The new paper has the unqualified endorsement of George Rosey and other leading musicians. They invite orders for sample reams or any quantity of new paper.

In a fire which occurred recently in this city, a great loss was suffered by a party who has made fame as the Sherlock Holmes of the talking-machine business. A representative of this journal called after the fire and was shown a large quantity of fire scarred models of various duplicators, patterns for Phonographs and Graphophones, etc. The loss, however, will not be so keenly felt by the party in question, as we understand he always makes a "duplicate" of everything for protection against loss.

Mr. F. Oscar Elmore, who has for many years been connected with the leading Phonograph Companies, enjoys an enviable reputation as a pianist and organist. His records are correct and brilliant. He is organist for one of the leading churches of the State. He is now engaged by the Lyric Phonograph Company, where he is having great success with his organ records. Any one wishing a list of his selections can obtain same by applying to the above firm. Mr. Elmore will also make any special record to order.

From rumors which have come to us it would appear that the parent wax cylinder companies anticipate the failure to longer control the duplicating of records. Several suits are now being fought strenuously with apparent success so far to the defendants. Neither the Orange nor the Bridgeport companies will now sell blanks in the United States unless they are guaranteed for export and they are shown the shipping documents to prove the shipments. By refusing to supply blanks in the United States can the companies alone hope to shut off the duplicating of the records other than in their own factories.

Hawthorne & Sheble, horn manufacturers of Philadelphia, Pa., have just completed two of the largest horns ever made. Think of a horn measuring twenty feet in length, with a bell six feet in diameter. This enterprising firm received an order for two such horns, for the United States Government, to be used experimentally, as fog megaphones. They are used in conjunction with a steam siren and can be heard ten miles at sea. This firm is probably the only one in the United States with tools and equipment sufficient to fill such an unusual order. Considering how recently the business has developed, it speaks volumes for their push.

The new talking-machine "The Vitaphone" is the latest. This machine is similar in construction to a Gramophone. The records are very attractive in appearance, being a rich red color, and their quality seems to be on a par with its prototype. As the patents on talking-machines expire one by one, the public undoubtedly will be treated to an epidemic of "Phones" and "Graphs" of all descriptions, sizes and kinds. We wonder if this machine is a forerunner of this approaching

era. It seems to have a sponsor, however, as it has a tag conspicuously displayed that it is licensed under the patents of one of the prominent talking-machine companies.

The Vitaphone, the latest flat disk machine, has already been notified by the Berliner Gramophone Company, that it is infringing their patents and must not be put on the market. As the United States Court of Appeals has decided that the Berliner Gramophone Company are the owners of the patents on which the Vitaphone Company claim to have a license from another Company, it would seem that the Vitaphone is sailing in rather shallow water. The red disks advertised by this Company are copies of regular Gramophone records and considering that they are quadruplicates from the original they are not half bad if all are as good as those our representative heard.

We note that the names of the various talent employed by the Columbia Phonograph Company have been omitted in a recent catalogue issued by them. In the case of one prominent artist whom we have interviewed he informs us that the adoption of their new policy is a flagrant violation of the company's contract. Much unfavorable comment has been expressed in general. Perhaps the Columbia people do not realize the fact that they employ the best talent available in this particular branch of their business. This change in the catalogue creates a vast amount of dissatisfaction among them. Such names as Spencer, Gaskin, Quinn, Porter, Meyers, Cal Stewart, etc., have heretofore been featured in their printing matter.

Mr. W. Barry Owen one of the principal stockholders of the London Gramophone Company, made a flying visit to America sailing for home on the "Majestic," November 21. Just before his departure Mr. Owen stated to our representative that the Edison Bell Consolidated Phonograph Company, who had started suit against this company sometime ago for alleged patent infringement, were now anxious to know how little the London Gramophone Company would accept for damages and the Edison Bell Consolidated Phonograph Company withdrew their suit. From the above it would appear so far that the owners of wax cylinder patents have been unable either in this country or Europe to invalidate the Gramophone patents.

The Automatic Stereoscope Company, of New Haven, Conn., have placed upon the market several new slot machines. Their advertising in this issue indicates that they have met the demands of the trade by furnishing machines of all grades. They have the great advantage of being able to supply views from the negatives of the Stereo Cosmorama Companies and of course it is the quality and quantity of the views used in slot machines that constitute their value as money-earners. Speaking of the Stereo Cosmorama, we understand that most of the Cosmorama Companies are shortly to be consolidated into a new company with a capital of \$500,000. This does not include the foreign companies. The Cosmorama is manufactured in New Haven, Conn., and four of the present companies are incorporated in Connecticut. The American and British Cosmorama Company, capital, \$100,000, is also incorporated under the laws of Connecticut. This company reports good business in England, especially in London, where their agents have several hundred machines in operation. The Cosmorama was the pioneer optical slot machine, having been in operation about seven years.

Varied Uses of the Kinetoscope

Already an institution in recording for both present and future the notable scenes and occurrences of the world, kinetoscope of moving pictures are becoming useful for scientific as well as for amusement purposes.

In hospitals, particularly, the invention is finding wide application. One hospital in New York is now adopting a machine to record minutely the actions of patients in epileptic fits and similar affections and many moving pictures have been taken showing the movements in walking of persons afflicted with locomotor ataxia. Reproduced a number of times, slowly, on the screen, doctors are enabled to study their systems more carefully in their laboratories. And the pictures taken in Vienna, showing operations being performed by famous surgeons become valuable instructors to medical students. It is also in hospital work that this invention with the microscope attachment, or micro-kinetoscope, is finding the greatest practical use. The movements of all kinds of microbes when thus photographed make striking animated pictures, which mean a good deal to the practitioner, and the actions of healthy and diseased corpuscles are easily distinguished when thrown upon the screen and magnified thousands of times. Such pictures of diseased blood, taken from time to time, show the improvement or decline in patient's conditions. Dr. Robert L. Watson, was one of the first to discover many strange phenomena in the action of live blood corpuscles in this way.

It has just been found by one of the leading experimenters that X-ray photography now so valuable in hospitals, may be wonderfully developed by the use of the biograph camera, as it is equally possible to take moving pictures with the penetrating light. He believes there is no function of the human body which may not be shown in action by such pictures, even to the beating of the heart and blood circulation, affording great possibilities for new researches in philosophy.

Many of the animated pictures that are exhibited now for their beauty alone will likely be useful in school instruction and lecture work, but the difficulty, so far, as was the case with the early development of the Phonograph, is that these machines are reserved for exclusive prices, and will only be brought within the reach of public instructors as their possibilities and improvements bring great demand for them.

One of the novel subjects that will soon be put on exhibition will show minutely the growth and flowering of plants from the time of planting until in full bloom. To obtain such results as these a special room is being set aside in the new botanical gardens at Bronx Park, N. Y. In order to show the entire growth of a lily on the screen in one series the biograph cameras and the growing bulb will be arranged in position in this room and a picture will be taken every half hour continually for about thirty days and nights. In order to get a uniform light for every view artificial illumination will be employed. Something like 1,000 will therefore be made of one subject, the final pictures showing the opening of the lily, and then its fading away. Though such results have previously been obtained, they were not taken with the necessary uniformity of light. This work will be under the direction of T. S. McGregor, curator of the gardens. Experiments of this kind, too, are being made to show rapidly the changes in scenery from winter to summer, etc.

The experiments of F. Flammarion, the celebrated French astronomer, show the possibilities of the biograph for recording astronomical wonders. He has taken moving pictures which show moonrise, the milky way, lightning, shooting stars, sunrise and sunset. Professors of astronomy in Columbia college also realize the possibilities of the invention in their work and experimenters are improving extremely sensitive films necessary to take impressions of the weak astronomical rays of light. It is particularly the phenomena of the heavens seen at intervals of many years—a strange eclipse, transit or meteoric shower—which men travel far to observe, which astronomers hope to preserve in photographic effects, making it possible for those at home to observe the heavenly wonders that few now have the opportunity of seeing.

And as the microscope has been combined with the biograph, so also the astronomer's telescopic lenses are being combined, so that we may see distant movements invisible to the naked eye. Many of the moving pictures of naval actions, which naturally could not have been taken at close range, have resulted from the telescopic attachment.

Captain John Finley, the expert on tornadoes, now in the American meteorological service, has taken some remarkable moving pictures of lightning storms and expects to get some striking pictures of the approach of a Kansas tornado.

Another new and novel exhibit is a brilliant display of fireworks, taken at night. While it has hitherto been impossible to photograph fireworks, by the use of magnesium powder the biograph has faithfully recorded the shower and pinwheel effects of the most costly pieces made.

An adventurous operator in Europe devised the idea of taking pictures from the bottom of the car of a balloon in motion. As it ascended rapidly successive pictures were taken straight downward, showing the spectators, then the surrounding houses and trees, then the roofs and country, fading rapidly until all that could be seen were dark patches on the earth.

The biograph camera was made to perform another remarkable feat. Placed on the top of a Brooklyn bridge tower one clear day, it was turned so as to take pictures in every direction of the compass, covering fifteen miles in every direction. In the few moments it takes to show these pictures on the screen the spectators are given a panorama covering something like 500 square miles.

An operator, speaking of some of his experiences, remarked: "I was crossing a ferry with my machine one day when I saw what was sure to be a collision between two schooners. I at once set my machine working, and when these boats struck it made an exciting scene for exhibition purposes, with snapping of spars and rigging. I got the pictures, but they never appeared on the screen. The case was taken to court and one of the interested parties who saw the pictures taken gave me \$250 to destroy what would have proven an unquestionable witness in court.

In exhibiting a Haubnrg bridge scene in Boston recently one of the persons who was shown to cross the bridge was recognized as one for whom detectives had been searching. This at once put them on the right track for his capture. And the value of the kinetoscope on the race track was recently shown, having proven evidence which settled a discussion over the places in a road race.

Exciting and amusing magical moving pictures are being exhibited by clever Parisian entertainers. By curious methods resorted to in taking the pictures almost any result may be produced on the screen as though it really happened. By

the use of their wands magicians make hosts of living creatures appear and disappear, apparently behead and shoot one another in battle scenes on the screen and immediately restore them to life again or make them appear in two places at once. To get these natural effects duumy figures made up exactly like the persons they represent are used momentarily when the pictures are taken, the living persons suddenly taking their places again and apparently reviving from death. And by omitting several of the pictures in a series of films, strange disappearances and sudden reappearances are produced in elaborate dramas.

One expert, who is doing perhaps as much as any one man in improving and developing the biograph, is constantly finding remarkable new applications for the machine. He believes that it will furnish the best means of identifying criminals. Animated pictures for the rogue's gallery may be made of criminals while walking or talking, from an adjoining room, without their knowledge, showing their real characteristics. It is thought that a person's general actions are remembered better than simply one's features and the pictures so taken would be placed in the small mutoscopic cabinets, in which pictures are observed by turning a handle. In fact this will soon be the popular way to have pictures taken. A large public gallery will shortly open in one of the world's greatest hotels, where people can have moving pictures taken of themselves in characteristic actions, which will be placed into the small mutoscopic cabinets, such as are used for home amusement. When these cabinets have become household articles this expert sees a new field for them, in that they will enable people to witness the popular events of the day. Sets of pictures showing the exciting scenes—the yacht race, athletic game, court scene or other event—will be made in such quantities and so reasonably as to be distributed daily like newspapers for home use in the cabinets; thus we may see the day's notable occurrences as well as reading the reports.

Pictures of the Klondike

Kinetoscope Views Which Edison Will Send to the Paris Exposition

A remarkable collection of films for a moving picture machine is now being developed at the laboratory of Thomas A. Edison in West Orange. The pictures are from the Klondike and are intended for the exhibit Mr. Edison is to make at the Paris Exposition. All the films which have been developed have been successful. The entire series will show actual life in the Klondike as it has never been shown before.

The photographing party started for the Klondike in June, 1898. Thomas Crahan and R. K. Bonine, the latter Mr. Edison's personal representative, being at the head of the party. Dr. Bonine had previously visited the region and was in charge of the route and the selection of the views to be taken.

Mr. Edison made a machine for the expedition which took pictures nine times the size of the ordinary ones. In order to use the larger film it was necessary to reduce the speed of the machine from forty-five to twenty pictures a second. The reduction in speed has resulted in a gain in clearness.

Charles A. Van, with Washburn's Minstrels, has an immense success in the reigning ballad, "My Little Georgia Rose," also featured by Lillian Jerome, J. J. Cluxton, Lloyd Gibbs, John P. Curran, Gus. P. Thomas and George B. Alexander.

Legal Notices

The Edison Phonograph Company of Cincinnati, O., has filed suit in the Superior Court to enjoin Ilsen & Company from renting or selling any of the Edison Phonographs, Graphophones or talking-machines in this city and state. It is alleged that under the contract and rights acquired from the owners of the patents of the machines the plaintiff has the exclusive right to rent and sell the machines in this state, and that the owners have been disregarding the rights of the plaintiff under its contract. C. W. Baker, attorney.

E. H. Friend, attorney for Jeffries, Sharkey, Thomas O'Rourke and William Brady, got an injunction from Justice Bookstaver restraining George H. Huber, of Huber's Museum, in East Fourteenth Street, New York City, from showing moving pictures of the big fight on November 3, last.

Friend alleges that less than eight per cent. of the pictures are genuine; that the managers of the fight were under heavy expenses for the illumination of the building and that arrangements had been made with the fighters for reproducing the fight with the biograph. It is contended that the taking of the pictures was a part of the sparring exhibition. This the first injunction ever served on the exhibitors of any moving pictures.

Proceedings have been begun in the United States Circuit Court by Fred. C. Hieronimus against Frank P. and George Leffingwell to recover \$10,000 damages. It is understood that Hieronimus, invested between \$5,000 and \$10,000 to aid Leffingwells in the promotion of a device for taking and exhibiting cinematographic views in a manner much more rapid than the method now in use.

The declaration, which will probably be filed soon, will allege that the device in question is not in reality patentable and that Hieronimus was induced by false representations to invest his money. No patent has been issued, though a caveat had been filed, and the issuance of the patent has been pending for over a year.

A Library of Voices

The Phonograph as a Cure For Throat and Vocal Troubles

A brand new use for the Phonograph has been discovered, and this now quite common household toy will henceforth become an implement of medical scientists. The doctors—those at least who make a special study of throat affections—have opened up a new field of usefulness for the little instrument.

There are in New York a number of medical laboratories where the tables and shelves are laden down with every type of Phonograph into whose funnels for several months past the coughs, hoarse whisperings and all the labored sounds of diseased throats have been poured and fixed permanently upon cylinders of wax. Every malady of the palate, throat, chest and nasal cavities has been registered in this way and all for the advancement of science and the ultimate benefit of afflicted humanity.

One doctor—a man of national reputation and one of the most progressive physicians—has a collection of these curious Phonograph cylinders that is worth a medical college education for the

student of that delicate organ, the throat. Marked, dated and described, this doctor's Phonographic cylinders can be brought out at any time, slipped into one of the little talking machines and the whole study of the case reviewed.

One of the pioneers in "medical phonetics"—that's what he terms it—has over 600 cylinders with records of coughs and at least 1,200 others, carrying the voices of some of the world's greatest singers.

It is a part of this physician's practice to minister to the imported song-birds of the Metropolitan Opera House, and the slightest disorder of the vocal chords of any of these singers is fixed on a cylinder of one of the more delicately constructed Phonographs in his possession. Nor has he confined himself to the registry of affected throats, for he boasts whole passages from noted German, French and Italian operas as sung by the foremost musical exponents of these several schools of song. This collection of human voices makes what is undoubtedly the most curious library in the world, and one of the most valuable, too, from a scientific standpoint.

Strange, indeed, are the stories of disease told by these cylinders of throats and vocal organs only slightly affected, of throats in somewhat advanced stages of various maladies, and finally, examples in which disease has reached its worst form and no cure is possible—the last hacking cough of a consumptive, for instance. There is tragedy in many of these tiny rolls of wax and the voice of the dead speaks from many of them with grewsome interest. With the familiar tubes of the Phonograph at his ears, the medical student or physician can hear as plainly as if the patient were before him, the exact sounds accompanying all sorts of throat troubles.

Comparing, by the use of different cylinders, disease with disease, and cough with cough, it becomes possible now to gauge the exact intensity of the ailment that is being studied and to map out more effective cures. With the greater perfection of the Phonograph there is likely to be a complete revolution in the way of treating all throat affections. If a patient returns for treatment, even after years of absence, all the throat doctor has to do is to turn to his box of cylinders, listen to the noises they give out and have the case as fresh in his mind as if it had been intrusted to him only yesterday and he had been thinking about it all night. It is easy to see that this Phonographic system of keeping records of cases will, in a few years, become as useful as the old method of surgeons of preserving parts of the human body in alcohol. It matters not how weak the voice is; even the hoarest breathing out of a sound records itself upon the cylinder and can be reproduced in its precise intensity. This is the great scientific value of Phonographic registering of vocal sounds.

To take down the record of any talking voice, all that is needed is to have the Phonograph carefully adjusted and to see that the record is clearly and distinctly made. The Phonograph in everyday use does not give this, conveying only the general impression, rather than the exact tone quality which is necessary for scientific investigation. To obtain the precise results he wants, and to make sure that the record shall be set down without deviation, the Phonographic doctor uses a special diaphragm which moves a delicate needle that cuts more deeply and yet more lightly than does the needle on any ordinary machine. Two or three minutes of talking or whispering is all that is necessary to complete a record. So finely balanced are these medical Phonographs that the buzzing of a fly or the "singing" of a mosquito can be perfectly recorded and reproduced. It is a difficult matter to register a singing voice with

exactness, but an improved apparatus is employed, which is so finely adjusted that if the singer be tired or "out of voice"—as musicians say—that fact is made perfectly apparent in the reproduction.

It might seem that a collection of so much that is delicate, brilliant and perfect in the way of sound would be unnecessary and superfluous in scientific records that concern diseases of the voice, but these examples have a special value for the purposes of comparison, representing, as they do, the possibilities of the vocal chords in exceptional instances.

There is now in use among a few New York throat specialists a microphone which will take the heart and chest sounds and set them down upon a cylinder in such a manner that they can be heard and distinguished by any layman. This is a remarkable contribution to modern medicine. Other uses of the Phonograph among doctors are its employment for correcting the errors of speech—stammering for example—and by this means persons afflicted with any vocal impediment can be trained out of their faults.

While not in any way connected with a consideration of the Phonograph as a medical appliance, it is interesting to know that the talking-machine is to be largely used during the next Presidential campaign as an easily controlled political arator. The plan is to scatter Phonographs over the country, putting one in the principal Square of each town. The men who will push this project say that Phonograph cylinders will make excellent campaign thunder and will take the place of printed pamphlets and stump-speakers to a great extent.

People will listen to a political Phonograph because of the novelty of the thing and because they can drop the ear tubes when they are tired or disagree with the sentiments expressed by the machine. The Phonographs will be loaded at the headquarters of both of the national parties with campaign songs, both patriotic and comic, and with brief speeches talked into the machines by the candidates of both sides. Only a small fraction of the men who will cast their votes will be able to see or hear the great leaders, and the Phonograph, it is thought, will be a satisfactory substitute.

Our Tattler

Reports are received from North, East, South and West that would indicate this to be the banner year in the talking-machine line. It is wonderful how the business has grown. How well the old timers remember when genial "Rus Hunting" called to see them with the latest product of his versatile brain, and how Len Spencer would astonish his friends by telling them how he attended church regularly—he did not explain it was to take chime records—ah! those were good old days, but do we not all agree that these are better?

In one of the city resorts where Phonographs are used to entertain the throng while it unloads its wallets, the crowd grew very dense—too dense to facilitate business. Then the proprietor put another piece in the instrument and the words rang out with that peculiar music hall intonation:

"If you hain't got no money, you needn't come 'round."

It was a very pertinent hint, and the visitors took it, many of them filing out into the street and leaving the others to be entertained and to buy or to bluff it through, as they wished.

Wants and For Sale

Special "Want" and "For Sale" advertisements will be inserted in this column at the uniform rate of three cents a word, each insertion. Answers can be sent in charge of "The Phonoscope" if desired. All letters received will be promptly forwarded to parties for whom intended, without extra charge.

FOR SALE—100 Artoscopes, nickel-in-the-slot picture machines, all in good order; make an offer for one or the lot. Address, A. B. care Phonoscope Publishing Company, 4 East 14th Street, New York City.

FOR SALE—Graphophone Recorders, new, \$3.50 each. Address, C. D., care of Phonoscope Publishing Co., 4 East 14th Street, New York City.

FOR SALE.—Now ready, bound copies of THE PHONOSCOPE Vols. I and II. Price \$2.00 per volume. Address Phonoscope Publishing Co., 4 East 14th Street.

FOR SALE.—Home Grand Graphophone, more than twice as loud as the voice or vocal rendition, including recorder, reproducer and shaving-knife, large brass horn, records, blanks, etc. Address, J. K. care of Phonoscope Publishing Company, 4 East 14th Street, New York City.

FOR SALE—Complete talking-machine outfit, consisting of the Eagle Graphophone, 6 records, 3 blank cylinders and 2-way hearing tube. Price \$50. Address, J. W. care of Phonoscope Publishing Company, 4 East 14th Street, New York City.

Bound Copies of

The Phonoscope

Volumes 1 and 2

\$2.00 per volume

Every Phonograph Dealer, Operator or Individual interested should secure these bound copies.

Phonoscope Publishing Co.
4 East 14th Street
NEW YORK CITY

New Films for "Screen" Machines

The following list of new films has been compiled from lists sent us by the leading foreign and domestic manufacturers

DEWEY FILMS

Eight parties were equipped on the occasion of Admiral Dewey's arrival in New York, Wednesday, September 27, 1899, and secured the following excellent moving pictures of the Admiral and his great ship, together with the stirring events of Dewey Day, September 29, the day of the Naval Parade and Dewey Day, September 30, the day of the Land Parade.

This was the only photographic apparatus on board the U. S. Cruiser Olympia on this memorial occasion. The Admiral posed especially for this camera.

PANORAMIC VIEW OF GRANT'S TOMB, RIVERSIDE DRIVE. Showing throngs on the River banks watching parade.

POLICE BOATS AND PLEASURE CRAFT ON WAY TO OLYMPIA. Showing Hospital Boat 'Missouri' and Gun Boat 'Dupont,' the latter under full speed.

ADMIRAL DEWEY LEADING LAND PARADE ON RIVERSIDE DRIVE. Showing Naval Brigade of North Atlantic Fleet, followed by Schley, Sampson, Miles and other celebrities, The Admiral is in a carriage with Mayor Van Wyck.

MOUNTED POLICE, SOUSA'S BAND AND SAILORS FROM U. S. S. OLYMPIA.

ADMIRAL DEWEY AND MAYOR VAN WYCK GOING DOWN RIVERSIDE DRIVE. Showing Battleship saluting on Hudson River.

PANORAMIC VIEW OF NAVAL FLOAT (OLYMPIA.)

PRESENTATION OF NATION'S SWORD TO ADMIRAL DEWEY by Secretary Long, at Washington, showing President McKinley, the Admiral and many other celebrities.

WEST POINT CADETS IN LAND PARADE.

TENTH PENNSYLVANIA VOLUNTEERS IN DEWEY LAND PARADE.

BATTERY K. SIEGE GUNS IN DEWEY LAND PARADE.

GOVERNOR ROOSEVELT AND STAFF IN DEWEY LAND PARADE.

ADMIRAL DEWEY LEADING LAND PARADE, EIGHT AVENUE. Showing Central Park in background.

U. S. MARINES IN DEWEY LAND PARADE.

FLAGSHIP OLYMPIA AND CRUISER NEW YORK IN NAVAL PARADE.

ADMIRAL DEWEY'S FIRST STEP ON AMERICAN SHORE.

PANORAMIC VIEW OF CRUISER OLYMPIA. With the entire White Squadron in the background.

ADMIRAL DEWEY AT STATE HOUSE, BOSTON, MASS. This picture shows Dewey coming down the State House steps leaning on the arm of Governor Walcott.

New Records for Talking Machines

The following list of new records has been compiled from lists sent us by the leading talking machine companies of the United States

- Always Steve Porter
- A Picture No Artist Can Paint Steve Porter
- Any Sacred Solo (with organ) Miss Mann or Messrs. Havens & Hooley
- Bell Trio (Pinafore) Lyric Trio
- Bugle Calls Wm. J. Styles
- Church Scene Old Homestead Original Lyric Trio
- Cantilena (Violin Solo) Mr. Erdman
- Daughter of Love Waltz (Mandolin) Mr. L. Wolfe
- Dolly Dear Geo. Gaskin
- Duet from Carmen Miss Mann and Mr. Madeira
- Everybody Have a Good Time Dan Quinn
- Everything is Rag-Time Now Len Spencer
- Fly Forth, O Gentle Dove Miss Mann
- Good Night (Dorothy) Original Lyric Trio
- Hannah's a Hummer Dan Quinn
- I Couldn't Do a Thing to You Dan Quinn
- In Dahomey Dan Quinn
- I've Waited Honey, Waited Long For You Dan Quinn
- International March (Mandolin) Mr. L. Wolfe
- I Loves Yo', Deed I do, Ma Babe Miss Mann
- I Want My Lou Lou Anna Barthold
- I'd Leave Ma Happy Home For You Len Spencer
- I've Waited Honey, Waited Long For You Len Spencer
- I've Waited Honey, Waited Long For You Mr. Havens
- Loin du Bal (Violin Solo) Mr. Erdman
- Lullaby from "Emmie" Anna Barthold
- Love's Old Sweet Song (Violin Obligato) Miss Mann & Mr. Erdman
- La Larcenet, Piccolo Solo Geo. Schweinfest
- Louisiana Lou (Violin Obligato) Miss Mann & Mr. Erdman
- My Honolulu Queen Dan Quinn
- My Love Keeps on a Growing Miss Mann
- My Babe From Boston Town Dan Quinn
- Mr. Johnson Turn Me Loose Anna Barthold
- My Hannah Lady (Orch. Acc.) Len Spencer
- My Loves the Same Geo. Gaskin
- Ma Lady Lu (Violin Obligato) Miss Mann & Mr. Erdman
- My Blackbird (Orch. Acc.) Len Spencer
- March Trio (Charlatan) Original Lyric Trio
- Micheal Murphy as a Gas Bill Collector J. R. Gannon
- Musette—Offenbach (Cello Solo) Muster Jean Moliere
- Murphy as a Political Speaker J. R. Gannon
- My African Queen Dan Quinn
- My Creole Sue Steve Porter
- My Little Georgia Rose Steve Porter
- Narcissus (Violin Solo) Mr. Erdman
- No. No. 'Tis You Lyric Trio
- One Little Word Steve Porter
- O That We Two were Maying Miss Mann and Mr. Madeira
- On Billow Rocking (Chimes of Normandy) Mr. Havens
- Page Song (Huguenots) Miss Mann
- Reception Polka (Cornet) Wm. J. Styles
- San Francisco Sadie Dan Quinn
- Rosie Carey Anna Barthold
- Solo from "Boccaccio" Anna Barthold
- Solos from "The Singing Girl" Miss Mann
- She'd Never Been There Before Anna Barthold
- Sunny Southern Home Geo. Gaskin
- She is More to be Pitied Than Censured Anna Barthold
- Scene De Ballet (Violin Solo) Mr. Erdman
- Smoky Mokes Len Spencer
- Sweet Little Maid From Ireland Geo. Gaskin
- Suwanee River Anna Barthold
- Sacred Duets (with organ) Miss Mann & Mr. Havens
- Screenade (Mattioli) Miss Mann
- Simple Aven (Cello Solo) Master Jean Moliere
- Sis Hopkins J. R. Gannon
- Sweet Rose, Yodel Song and Dance Geo. P. Watson
- The Oriental Coon (Orch. Acc.) Len Spencer
- Think Once Again Before We Part Anna Barthold
- The Rag-Time Hymn Dan Quinn
- Two Roses Miss Mann
- Trio from "The Singing Girl" Lyric Trio
- The Hottest Ever Dan Quinn
- Three Wishes Miss Mann
- The Girl I Loved in Sunny Tennessee Steve Porter
- Trueneric (Cello Solo) Master Jean Moliere
- Tripping on the Green Reed's Orchestra
- The Kissing Bug Steve Porter
- Those Cruel Words Good-bye Steve Porter
- Vienna Forever (Mandolin) Mr. L. Wolfe
- Where the Sweet Magnolia Blooms Miss Mann
- When the Swallows Homeward Fly Anna Barthold
- Where the Sweet Magnolia Blooms Steve Porter
- Won't You Take Me Back to Dixie Steve Porter
- Waltz Song (Romeo and Juliet) Miss Mann
- Warmin' Up in Dixie Reed's Orchestra
- We All Went Down to Murphy's on a Sunday J. Gannon
- Uncle Josh in Society Cal Stewart
- Uncle Josh and the Lightning Rod Agent Cal Stewart
- Uncle Josh in the Chinese Laundry Cal Stewart

The Latest Popular Songs

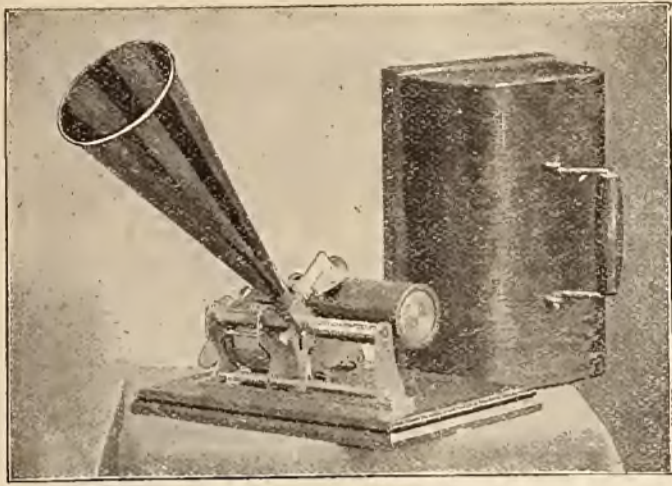
The following is a list of the very latest popular songs published by the leading music publishers of the United States

- By the Lakes of Killarney Annie B. O'Shea 11
- Dream on Beloved Arthur Trevelyan 3
- For Love Alone J. Fred Helf 9
- Got Your Habits On John Queen 10
- Good Things Come High W. W. Herbert 1
- He Carved His Name Upon the Tree Gussie L. Davis 10
- How'd You Like to be the Iceman? Helf & Moran 9
- I Couldn't Spell That Word Because I Love You J. Fred Helf and G. B. Alexander 10
- If You Were Only By My Side E. T. Paull 11
- If I Thought You Loved Me Yet John V. Hollar 9
- I'm Livin' Easy Irving Jones 2
- I've Got Another Nigger on My Staff Sterling & Von Tilzer 10
- I Wonder if She's Waiting Harry von Tilzer 2
- I Love Ma Babe Andrew B. Sterling 2
- I've Just Come Back to Say Good-bye Chas. K. Harris 4
- I Got All I Can Do to Keep My Hands Off You Ford & Bratton 1
- In Fancy You are Ever by My Side J. A. Silberberg 1
- I'm a Little Too Stout Ma Baby Says Arthur Dunn 1
- I won't Play Second Fiddle to no Yaller Gal J. A. Silberberg 1
- Jes' a Misunderstanding With Ma Lady Love Herwitz & Bowers 1
- Just For the Old Days Stanley Haskins 5
- Lucy Dale Harry Linton 10
- Mamie Tracy Roger Harding 5
- Mary Had a Little Lamb Jos. Tabrar 9
- Mid the Green Fields of Virginia Chas. K. Harris 4
- My Love's the Same Roger Harding 7
- My Sunny Southern Home Roger Harding 7
- My Old Westchester Home Among the Maples Wm. B. Gray 9
- My Ann Elizer Malcolm Williams 5
- My Ababama Lize Wise and Perrin 5
- My Watermelon Boy Malcolm Williams 5
- Niggerism Williams Bros 4
- One Touch of Nature Makes the Whole World Kin Felix McGlennan 9
- Pretty Kitty Clover Roger Harding 7
- Promises of Light John Carrington 1
- Smoky Mokes A. Holzman 10
- Skeleton Dance W. V. Ullner 8
- Stay In Your Own Back Yard Lyn Udall 1
- Song of the Nose Victor Herbert 1
- The Little Tin Soldier Army W. T. Francis 1
- The Turn of the Road Eugene Cowles 1
- The Jack-Pot M. F. Carey 1
- Teach Me How to Love James B. Oliver 1
- That's How the Rag-Time Dance is Done Sterling & Von Tilzer 10
- The Girl I Loved in Old Virginia Max Dreyfus 2
- The Old Church Door Gussie L. Davis 11
- The Sermon That Touched His Heart Tony Stanford 10
- The Stories Mother Told Me Sterling and Von Tilzer 10
- The Hottest Ever—Cake Walk Song J. O'Dea 4
- Two Little Roses from Mother to Me Harry Yeager 7
- Those Cruel Words, "Good-bye" Fred Helf 9
- 'Tis Best For Us to Part Roger Harding 7
- 'Twere Better Had We Parted Long Ago W. C. Davies 5
- Why Did We Drift Apart Philip Staats 8
- Will I Find My Mamma There? Chas. K. Harris 4
- Will He Ever Return Vera Doré 3
- Wing Lee's Rag Time Clock Al Trabern 5
- Where'er I Go Will Thompson 1
- You Ain't de Kind of Coon I've Looking Fo' E. Nattes 1
- You'll Get All Dat's a Comin' to You Sterling & Von Tilzer 10
- You're It Gussie L. Davis 9
- You Ain't the Man I Thought You Was Lew Sully 9

LATE INSTRUMENTAL PUBLICATIONS

- A Warmin' Up in Dixie E. T. Paull 11
- At Sunrise John W. Bratton 1
- Clorindy Arr. for Piano by F. W. Meacham 1
- Great Ruby—March J. W. Hindley 5
- In Beauty's Bower Theo. Bendix 1
- Plantation Echoes Otto M. Heinzean 11
- Smoky Mokes A. Holzman 10
- The Gallant 7ist F. Fanciulli 10
- The Midnight Club Rickard Barker 1
- The Coonville Jubilee C. H. Collins 1
- The Rag Time Sports James Haack 8
- The Rajah Waltzes Samuel S. Aronson 8
- When I Gave My Heart and Hand to You J. Haack 8

Note.—The publishers are designated as follows: 1 M. Witmark & Sons; 2 T. B. Harms & Co.; 3 F. A. Mills; 4 Chas. K. Harris; 5 Myll Bros.; 6 J. W. Stern; 7 Kuickerbocker Music Co.; 8 Gabel Bros.; 9 W. B. Gray; 10 Feist & Frankenthaler; 11 E. T. Paull Music Co.



The Eagle Talking Machine, \$10.00

THE Greater New York Phonograph Co.

61 West 11th Street,
NEW YORK CITY

SUPPLIES AND ACCESSORIES FOR
ALL KINDS OF TALKING-MACHINES

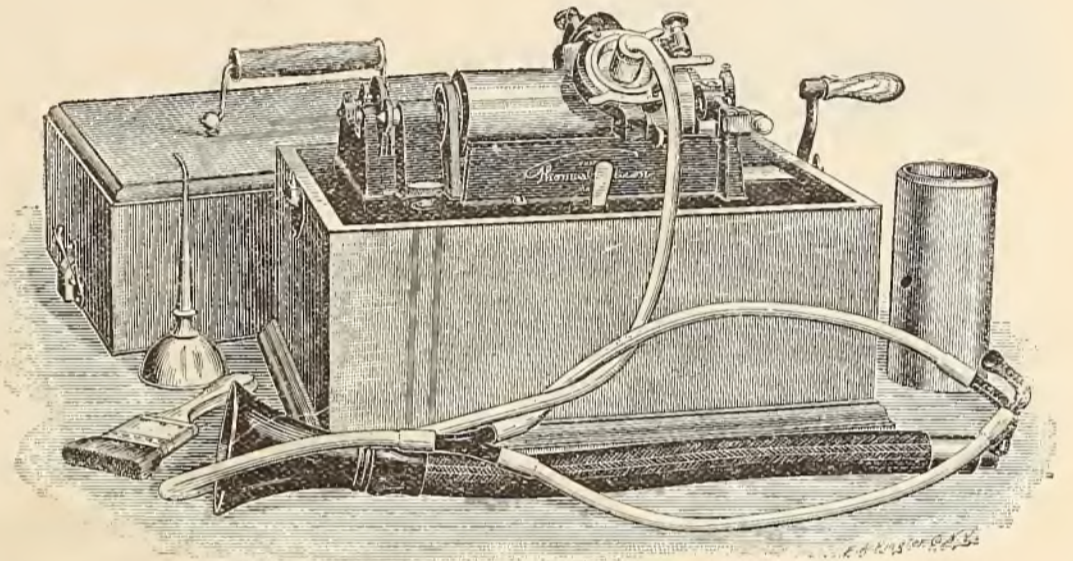
SEND FOR CATALOGUE

SELECTED RECORDS

Originals \$1.00 each
\$10.00 per doz.

xxx

Duplicates 50 Cents each
\$5.00 per Doz.



New Standard Phonograph, \$20.00

THE VITAPHONE

THE VITAPHONE, in mechanical construction and audible results, is the highest type of the talking machine art. It is the Gramophone perfected. It will last forever. It is manufactured under basic patents owned by the American Graphophone Company. It runs by spring motor. The records are imperishable; they will not wear out or break.

Records are furnished by number from our catalogue, and include all the desirable selections usually offered talking machine patrons.



OUR GUARANTEE IS MADE A PART OF EVERY OUTFIT

These machines are offered to the Public with the utmost confidence by us that they will meet the popular favor they deserve

VITAPHONES sell at retail for \$15.00
RECORDS = = = per dozen, 6.00
NEEDLES = = = 400, 25 Cents



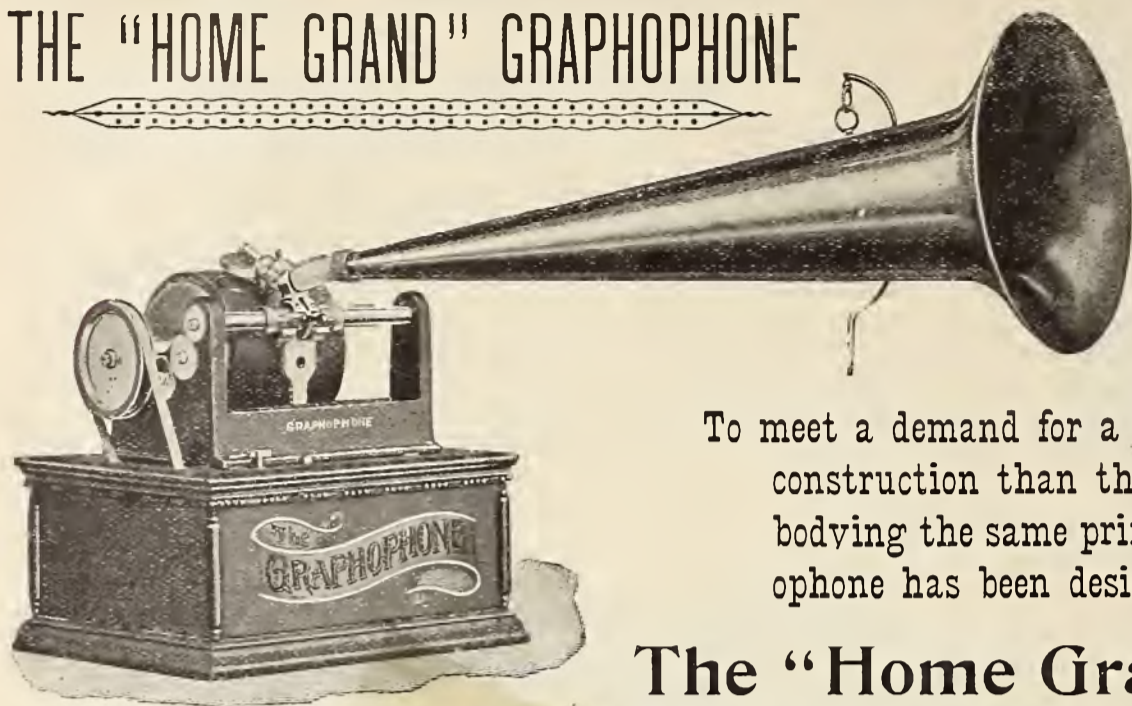
AGENTS WANTED
WRITE FOR DISCOUNTS

CONSOLIDATED SUPPLY COMPANY

100 New Street

NEWARK, N. J.

THE "HOME GRAND" GRAPHOPHONE



A Wonderful Talking Machine of the Genuine Grand Type for **\$100**

Not an Imitation, but the Real Thing!

Reproduces the same records as the Graphophone Grand with the same marvelous effects

To meet a demand for a Graphophone of less expensive construction than the Graphophone Grand, but embodying the same principles, a new form of Graphophone has been designed, known as

The "Home Grand," Price, \$100.

The farthest step forward ever made in the talking machine art, crossing the threshold of a new world of possibilities, was the discovery, in our laboratory, of the principles applied in the construction of the Graphophone Grand, which, when first publicly exhibited seven months ago, made a tremendous sensation by its marvelously loud and perfect reproductions of sound. Scientists hailed this achievement as a great discovery, for it swept aside the limits that had barred the way to absolutely perfect sound-reproduction. These principles are now applied with equal success in the production of the new "HOME GRAND" which is a machine of the genuine "Grand" type and not an imitation.

The "Home Grand" with Columbia Grand records brings, in audible effect, the living singer or musician actually into the presence of the listener.

Reproduces music, song or speech as loud and louder than the original, with all the original sweetness and melody.

The real music; the actual voice; not a diminished copy or a "far away" effect.

The "Home Grand" is handsome and durable in construction and simple in operation. It is provided with a tandem-spring motor that will run several Grand records at one winding.

No talking machine, except the Graphophone Grand, will compare with the new machine in point of volume or smoothness of tone.

New Prices for Grand Records

\$2.50 } June 1st the following prices for Columbia "Grand" records and blanks go into effect
RECORDS - - - - - \$2.50 BLANKS - - - - - \$1.50

The Five Dollar Graphophone

A Graphophone cheap but not a cheap Graphophone

This new Graphophone, as marvelous in its performance as in its price, is well-made and reproduces musical and other records brilliantly and perfectly. Clockwork motor.

PRICE - - \$5.00

Including Reproducer, 10-inch Japanned tin horn

PRICE, with recorder added - - - \$7.50 When accompanied by a recorder this Graphophone can be used for making records. The \$5.00 Graphophone is furnished when desired with a hand cabinet of neat design and a nickeled horn.

PRICE - - - - - \$10.00 Including—Bent wood hand cabinet, 10-inch Nickeled horn, Reproducer and Recorder.



The Five Dollar Graphophone

The Graphophone has been found to be the most satisfactory machine for exhibitors to handle. Outfits are arranged especially to suit the needs of the exhibitor. When a large amplifying horn is used the reproductions of music are loud enough to fill large exhibition halls.

This Company's establishment is manufacturing headquarters of the world for all Graphophone and talking machine supplies. COLUMBIA RECORDS have become famous because they are made under the direction of the most expert record makers. Our facilities enable us to supply records unrivalled in quality at less than the cost at which others can make inferior ones.

Amplifying Horns, Musical and other Records and Supplies of all kinds can be obtained at any of our offices

WRITE FOR CATALOGUE B-N

COLUMBIA PHONOGRAPH COMPANY DEPARTMENT B-N

143-145 Broadway, Corner Liberty Street, New York City

Retail Branch: 1155-1157-1159 Broadway

PARIS, 34 Boulevard des Italiens

CHICAGO, 211 State Street

ST. LOUIS, 720-722 Olive Street

SAN FRANCISCO, 723 Market Street

PHILADELPHIA, 1032 Chestnut Street

WASHINGTON, 919 Pennsylvania Avenue

BALTIMORE, 110 E. Baltimore Street

BUFFALO, 313 Main Street

BERLIN, 55 Kronenstrasse

Concert Phonograph Record Company

TALKING MACHINE RECORDS
We Manufacture Only Original Master Records.

What We Have:

We have one of the best equipped Phonograph Plants in this country. We have all of the latest, up-to-date and improved appliances for making records. We have the best skilled operators in the business found anywhere. We have and control the best talent and artists in the profession. We have the clearest, the cleanest, the loudest, the purest and best toned records for Phonographs, Graphophones and talking-machines that can be had.

WE ARE MAKING A SPECIAL FEATURE OF COON SONG RECORDS

Sung by Charles Clinton Clark

Mr. Clark is without any exception the best coon singer that ever attempted to sing in a Phonograph. We can verify this statement to the satisfaction of any one that will order a sample record. Mr. Clark's intonation, side remarks and witticisms makes his records head and shoulders above anything on the market in this particular line.

We have the original Casey Series of Master Talking Records made by
JOSEPH R. GANNON

E. T. PAULL Plays His Own Compositions

One of the features of our Phonograph business will be Piano Solos of Mr. E. T. PAULL, who will play his own compositions. Mr. Paull's ability as a march writer is second to none, and his compositions are known and played from one end of the country to the other. The number of records made by Mr. Paull will necessarily be limited, as all records made will be originals.

WHAT WE WANT

We want every dealer in talking-machine records to try our **original master records**. We want every person who has a talking-machine of any kind to have our records. We want every one interested in any way, in round cylinder records to write us for the **very low prices** that we offer to introduce our production.

SPECIAL NOTICE

We guarantee to furnish a better record at a lower price than any one else in the trade, who make a business of supplying original master records. Write us for the **special inducements** we shall make on a sample order to any reader of this paper, mentioning this advertisement.

Address all orders and communications to

Concert Phonograph Record Company

44 WEST 29th STREET, NEW YORK



WHEN IN NEED OF PRINTING
OF ANY DESCRIPTION CALL
OR ADDRESS

GIVE US A TRAIL

IMANDT BROS.
PUBLISHERS AND PRINTERS
4 East 14th Street
New York City

We cater to all who are interested in the Phonograph business, as we can furnish you with cuts of machines suitable for Cards, Billheads, Letterheads, Circulars, Catalogues, in fact anything in the line of Printing at reasonable rates . . .

Publishers of
"PHONOSCOPE"

"A LITTLE SPICE NOW AND THEN
IS RELISHED BY THE WISEST MEN."
**RECORDS FOR PHONOGRAPHS
AND GRAPHOPHONES**

ALL RECORDS "ORIGINAL," "no duplicates," made one at a time, every word guaranteed to be clear and distinct, and we are the only parties now making them. Send for Catalogue of "Concert" Records.

JOHN MONROE,
Laboratory and Phonograph Parlor
132 1/2 First St.,
Portland, Ore., U. S. A.

I. W. NORCROSS

O. OSBORNE

AMERICAN JEWEL COMPANY

MANUFACTURERS OF

~ MECHANICAL JEWELS ~

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	EACH	REPAIRING
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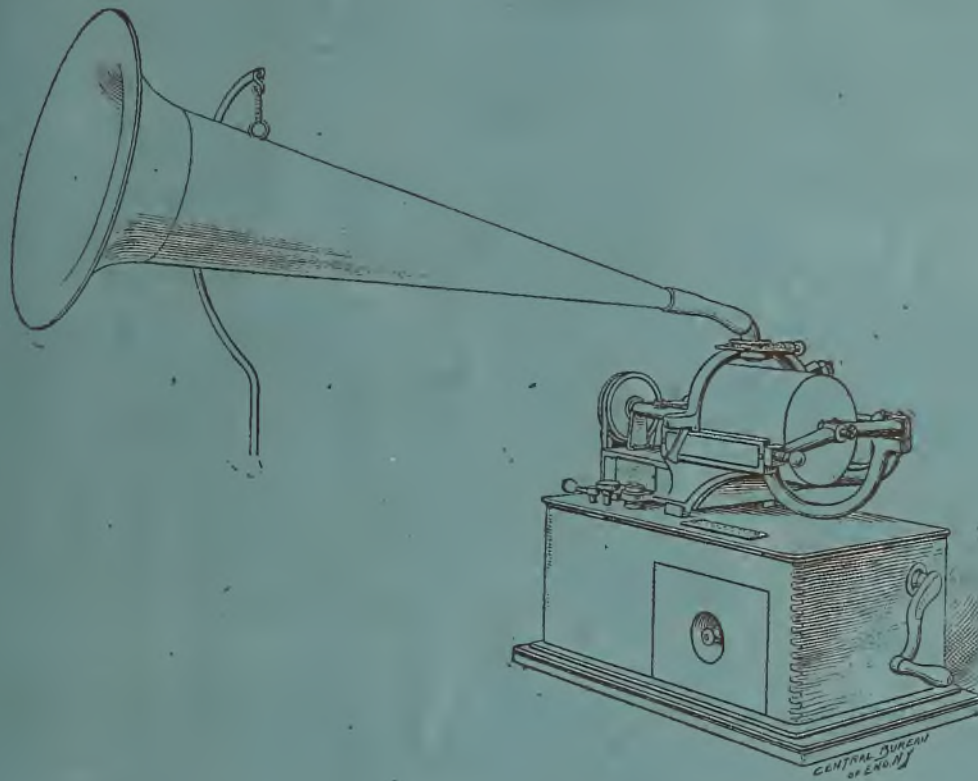
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