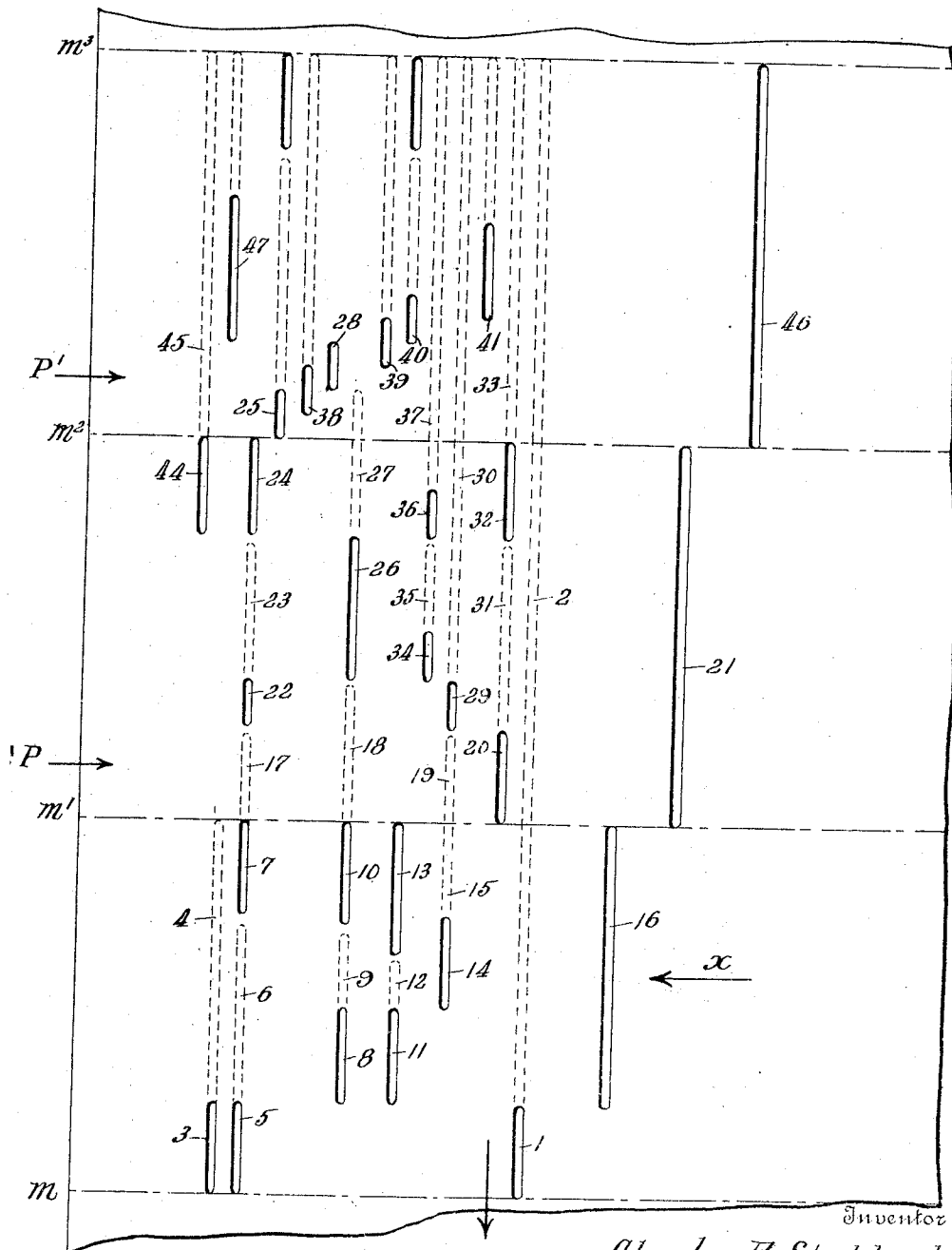


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 NOTE SHEET FOR PLAYER PIANOS AND THE LIKE.
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NOTE-SHEET FOR PLAYER-PIANOS AND THE LIKE.

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To all whom it may concern:

Be it known that I, CHARLES F. STODDARD, a citizen of the United States, and a resident of Boston, county of Suffolk, and State of Massachusetts, have invented a new and useful Improvement in Note-Sheets for Player-Pianos and the Like, of which the following is a specification.

This invention relates to note-sheets or the like, as, for instance, the well-known perforated note-sheets, for automatic or partly automatic musical instruments.

One of the principal objects of the invention is to provide a note-sheet characterized by a novel construction and arrangement of note-playing perforations such that the playing of an automatic piano-player, for example, is greatly and desirably improved, especially as regards the tone coloring and the correlation of tonal effects, and is enabled to produce, for example, the exquisite "singing tone" so-called, which characterizes and distinguishes the playing of some of the greatest artists.

The character of the invention may be best understood by reference to one illustrative embodiment shown in the accompanying drawing, which shows a perforated note-sheet such as may be used upon standard player-pianos or piano-players.

In the drawing an arrow indicates the assumed direction of travel of the illustrative note-sheet. The perforations represented by full lines are those which would have been cut in accordance with prevailing prior art practice, usually by reference to a score or record of the composition intended to be embodied in the note-sheet. The prior art practice referred to consists generally in locating the advance ends of the perforations in proper relations to play the notes in desired musical sequence, and giving to the perforations relative lengths corresponding to the relative duration of notes indicated upon the score or record.

In the illustrative improved note sheet of the drawing, the full line perforations are extended, as indicated in dotted lines, by being substantially prolonged to produce unique effects in tone coloring practically without regard to the duration of tones represented by the symbols or indications in the score or record. For instance, the perforation 1 has a prolongation 2 which extends throughout the length of that part

of the note-sheet illustrated in the drawing; and it is assumed that the note of perforations 1—2 is in harmony with all of the other notes played. The effect of this prolongation is to contribute the sounding of the note of this perforation to all of the harmonies which follow the initial sounding of the note and throughout the playing of all of the notes represented in the drawing. If the note sheet were cut in accordance with prevailing prior art practices, the note of the perforation 1 would have only the duration represented by the full line perforation 1 and its tone would not enter into any of the succeeding harmonies but would be entirely lost thereto; on the other hand, the prolongation 2 provides that the tone sounding element, the string, for instance, shall be maintained free to vibrate in response, not only to the original percussion, but also sympathetically in response to the vibrations of other notes which are sounded.

The specific perforation 1 with its prolongation 2 is of such character that its string is held undamped after the original vibration of the string (*i. e.*, that caused by the original percussion) has diminished somewhat and rendered the string sufficiently passive to respond audibly to the vibration of other strings which are struck. That is to say, the original vibration of the string may be initially so strong that, although it may tend to have or may have some sympathetic vibration, the latter will be relatively inaudible because of the predominance of the initial or master tone. When, however, this initial vibration has diminished sufficiently, the sympathetic vibration is enabled to predominate audibly so as to reinforce materially another tone which is sounded. Thus, the perforation 1—2 exemplifies a purposeful prolongation to provide not only for sustaining the initial or master tone, but also for audible sympathetic vibration to reinforce a concurrently sounding tone or tones. The transverse lines m , m' , m^2 , m^3 divide the perforations into three groups corresponding in general to groups of notes in the composition to be played. For example, the group between the lines m , m' may correspond to a so-called "pedaled section" of the score or record from which the sheet is made; *i. e.* a section through which a loud or damper pedal operation is sup-

posed to extend, as by being so indicated upon the score or record. That is to say, it may be assumed for illustration that the damper pedal is intended to be depressed and released at points corresponding respectively to the lines m and m' ; and to be again depressed and released at points corresponding respectively to the lines P and m^2 ; and again depressed and released at points corresponding respectively to the lines P' and m^3 . Thus the note sheet sections $m-m'$, $P-m^2$, and $P'-m^3$, may be considered as "pedal sections" of the sheet, so-called for convenient designation. Said three sections may be considered as comprising a musical phrase, for instance. It will be noted that the perforation 1 extends, for illustration, throughout three of these groups or sections. The perforation 3 has a prolongation 4 to sustain its note, or hold its string open for sympathetic vibration, throughout the duration of the first group m , m' , and a perforation 5 has a prolongation 6 extending into close proximity with a perforation 7 by which the same note is resounded in accordance with the musical sequence of the composition. The same is true of perforation 8, its prolongation 9, and a re-sounding perforation 10; and also of a perforation 11, a prolongation 12, and a re-sounding perforation 13. A perforation 14 has a prolongation 15 which sustains the tone into the next group. A note 16 is also sustained from its initial sounding throughout the duration of the first group. The hiatus between the prolongation 6 and perforation 7 is preferably short so as to minimize the interruption, if any, between the sustaining of the original note and the re-sounding, and preferably to give the effect of resounding the note while the same is still being sustained so that to all intents and purposes the tone may be substantially continuous and merely punctuated, so to speak, by the resounding. The same is true, preferably, of the prolongation 9 and perforation 10; and of the prolongation 12 and perforation 13.

With the described illustrative arrangement, it is seen that each note in the first group is sustained, following its initial sounding, substantially continuously throughout the duration of the group as a whole so that at all times each note may contribute either its own initial vibration or its sympathetic vibration to the volume of tone which is produced. For instance, by the full line cutting, according to the prior art, only two notes (those of perforations 14 and 16) would be sounding when the index X reaches the tracker bar and consequently the tone and harmony would be very meager; but with the illustrative prolongations embodying this invention, seven notes will be sounding (either normally or sympathetically)

when the index X reaches the tracker bar, and the resulting richness of tone and harmony will be remarkably different.

It will be noted that the perforations 1, 7, 10 and 14 have respective prolongations 2, 17, 18 and 19, which continue their corresponding notes from the first group of perforations, past the line m' , and into the second group of perforations. At the same time, the prolongation 4 of the perforation 3 is terminated at the line m' , and also the normal perforations 13 and 16 are similarly terminated. This illustrates the elimination from the continued volume of harmony of certain notes which, if further prolonged, would create substantial discord, or would be otherwise undesirable,—it being assumed, for example, that the strings of perforations 3, 13 and 16 would create material discord if left undamped to sound with the notes of the second group. The notes of perforations 1, 7, 10 and 14; however, being harmonious with the notes of the second group, they are continued by their prolongations so as to contribute their additional harmony to that of the succeeding notes. The note originally sounded by the perforation 5 is continued, preferably without substantial interruption, by the prolongation 6, re-sounding perforation 7, prolongation 17, re-sounding perforation 22, prolongation 23, and re-sounding perforation 24; but it is assumed that said note would not enter desirably into the harmony of the third group, and therefore the perforation 24 is terminated, for instance, at the line m^2 . In like manner, the note originally sounded by the perforation 8 is continued through the re-sounding perforation 26 and prolongation 27, the latter being terminated to avoid discord with the note of a perforation 28 in the third group. The note originally sounded by the perforation 14 is continued through a resounding perforation 29 and prolongation 30 which continues throughout the second and third groups, it being assumed that the note thereof is harmonious with the other notes. In like manner, the note of the second group originally sounded by the perforation 20, is continued by the prolongation 31, re-sounding perforation 32, and prolongation 33 throughout the second and third group; and, as already stated, the note of perforation 1 is continued by its prolongation 2 through all three of the groups. A new note is sounded by perforation 34 in the second group and is continued by the prolongation 35, re-sounding perforation 36, and prolongation 37 through the third group; and a new note sounded by perforation 44 in the second group is continued throughout the third group by its prolongation 45. The note of perforation 21, it is assumed, would not enter desirably into the third-group harmony, and therefore the

perforation 21 is not prolonged beyond its normal termination. In the third group additional notes are sounded by perforations 47, 38, 39, 40 and 41, and these are continued by prolongations and re-sounding perforations as indicated, with the result that when the line m^3 reaches the tracker bar, there would then be sounding (either normally or sympathetically) twelve different notes, some of them having been prolonged from the first group, others from the second group, and some merely prolonged within the third group. With the cutting in accordance with prior art practices, as indicated in full lines, there would be only three notes sounding at the time the line m^2 reaches the tracker bar. Thus, it will be evident to those skilled in the art that an arrangement of perforations contemplated by this invention may greatly improve the playing by permitting a very unique tone coloring and breadth of sustained tone and harmony which have never before been produced by means of a note-sheet. In fact, the typical result indicated at the line m^3 on the drawing would involve a breadth of sustained harmony and tone which could not even be procured in manual playing by any artist, however skilled, because of the fact that there are there twelve harmonious notes being sounded simultaneously (all of which could not possibly be played by the ten fingers of the performer) and preferably no inharmonious notes are being sounded, as would be the case if the performer endeavored to assist his manual operation by use of the usual damper pedal. It is obvious, therefore, that the invention is susceptible of application to situations in which even the most skilled manual rendition is surpassed in the beauty and breadth of the tone effects which can be produced.

The playing by such a note-sheet as that illustrated in the drawing far surpasses a manual performance, even when assisted by skillful pedaling. For instance, referring to the so-called "pedaled sections" already mentioned—if the damper pedal were operated to remove the dampers at the line m , all the tones would be sustained until the pedal is released at the line m' to redamp the strings for the purpose of eliminating the tones corresponding to perforations 4, 13 and 16, which are not desired to be continued into the next group. This redamping at the line m' would terminate the tones 1, 7, 10 and 15, which are desired to be continued, as well as those to be eliminated; and as a result a complete hiatus in the continuity of tone would occur. The undamping at the line P —the beginning of the next pedaled section—would not, of course, restore any of the tones terminated by the damping at the line M' . Thus, by the pedaling, the continuity of tone is substantially

interrupted between pedaled sections. In the illustrative note sheet, however, the prolongations 2, 17, 18 and 19 bridge over the period between the pedaled sections, avoiding an hiatus, and carry their tones into the next group while at the same time the tones of perforations 4, 13 and 16 are eliminated. Thus it is possible by this invention to produce a continuity of a selected tone or tones from one pedaled section to another.

It is possible, of course, to sustain tones in pedaled sections by employing a damper pedal mechanism of some known type in which all or a substantial fraction of the dampers of the piano are moved in unison to and from the strings to dampen and undampen. An embodiment of the present invention, however, produces a refinement in the tone coloring and the quality of the harmony which would be impossible in the use of a damper pedal mechanism. When the damper pedal mechanism is used, several dampers at least are operated simultaneously, so that in order to sustain the note of one string it is necessary also to undamp several neighboring strings, all of which, whether their notes are harmonious or discordant, are sustained or left open to vibrate sympathetically. The sympathetic vibration of a number of discordant strings creates a roughness or harshness in the resultant volume of tone which is avoided in the illustrative note-sheet by having no strings held undamped save those corresponding to the selected individual note-playing perforations which correspond to substantially harmonious notes. Thus, in order to produce a sustained continuity of tone volume or coloring, it is not necessary in the use of the improved note-sheet to hold any discordant string undamped for a material period of time; on the contrary, all necessary notes may be damped in season to prevent substantial discords, as in the cases of the perforations 3—4, 13 and 16, in the first group shown in the drawing.

Assuming, for illustration, that the perforations 16, 21 and 46 are intended to play theme notes, and all the other perforations are intended to play accompaniment notes—it will be evident that the illustrative arrangement of perforations and prolongations in the accompaniment provides a sustained and practically continuous and harmonious background, so to speak, against which the theme is sounded.

The full line perforation 28 illustrates a situation which may arise, involving one or more notes which are more or less discordant with neighboring notes and which are not desired to be continued in the sustained harmonies. The discord of one or more such notes will be in many cases substantially immaterial and insufficient to require that all of the prolonged preceding perforations

rations be curtailed to avoid discord. In other words, a note corresponding to a perforation such as illustrated by the perforation 28, does not enter materially into the harmonies, which, therefore, may be sustained substantially without any regard to the merely transient occurrence of such a note.

The desirable results which may accrue from the use of a note sheet embodying this invention comprises many others than those particularly pointed out above all of which will readily appear to those skilled in the art. It is practicable, though not indispensable, to prolong any given note perforation to an indefinite length so long as it does not too far overlap succeeding perforations of notes which would be prohibitively discordant. Furthermore, although the generally sustained effect produced by the prolongations is ordinarily desired to characterize the entire playing by the note-sheet, there are, of course, instances, as in phrasing, where it is desired or preferable that substantially all or much of the tone volume cease for a greater or less length of time; and to suit such and other circumstances the prolongations may be omitted or curtailed at proper points. Also, there are some compositions, or some passage constituting parts of compositions, in which the continuity of tone produced by the prolongations carried to their fullest development would not be feasible or desirable. Consequently, it is practicable to confine the application of this inventive idea to characterize those compositions, or those portions of compositions, only, in which the continuity of tone is desirable.

It is to be understood that the illustrative embodiment of the invention which is shown in the drawing may be variously modified to suit the characteristics of different compositions or interpretations, and the invention may be variously embodied otherwise, all within the scope of the subjoined claims.

I claim—

1. A note-sheet for player-pianos and the like, having note perforations therein with their advance ends relatively located to sound their notes in desired musical sequence; and having selected perforations prolonged beyond lengths corresponding to the notation on the score or record from which the sheet is made, said prolongations extending beyond the rear ends of non-selected perforations to add to the next succeeding harmony indicated on the score or record, the selected tones to the exclusion of the non-selected tones.

2. A note-sheet for player-pianos and the like, having note perforations therein with their advance ends relatively located to sound their notes in desired musical se-

quence; and having selected perforations prolonged beyond lengths corresponding to the notation on the score or record from which the sheet is made, said prolongations extending beyond the rear ends of non-selected perforations and overlapping following perforations to augment the tone volume of the latter by the addition of the selected tones to the exclusion of the non-selected tones.

3. A note-sheet for player-pianos and the like, having note perforations therein with their advance ends relatively located to sound their notes in desired musical sequence, and arranged to correspond with a succession of musical phrases; sections of the note-sheet corresponding to respective phrases being characterized by having perforations prolonged beyond lengths corresponding to the notation on the score or record from which the sheet is made, said prolonged perforations overlapping in succession along the lengths of the respective phrase sections and cooperating to produce a substantially continuous "singing tone" within the respective phrases.

4. A note-sheet for player-pianos and the like, having note perforations therein with their advance ends relatively located to sound their notes in desired musical sequence and to produce a succession of different musical harmonies; a section of the note sheet corresponding to one such harmony being characterized by having one or more perforations prolonged in said section beyond lengths corresponding to the notation on the score or record from which the sheet is made; and another section of the note-sheet corresponding to a different subsequent harmony, being characterized by having one or more selected perforations of said first section prolonged into said other section to the exclusion of non-selected perforations which are terminated short of said other section.

5. A note-sheet for player-pianos and the like, having note perforations therein with their advance ends relatively located to sound their notes in desired musical sequence and to produce a succession of musical harmonies; sections of the note-sheet corresponding respectively to such musical harmonies being characterized by having perforations prolonged beyond lengths corresponding to the notation on the score or record from which the sheet is made and such prolongations extending from one such section into a subsequent section to augment the tone volume produced by the latter section beyond that indicated by the score or record.

6. A note-sheet for player-pianos and the like, having note perforations therein with their advance ends relatively located to sound their notes in desired musical se-

quence; a section of the note-sheet corresponding to a musical phrase being characterized by having perforations therein prolonged beyond lengths corresponding to the notation in the score or record from which the sheet is made, said prolongations respectively overlapping following perforations until terminated, in the vicinity of the advance ends of perforations corresponding to tones discordant with the tones of the prolonged perforations, whereby to eliminate the tones of the perforations so terminated from succeeding harmonies.

7. A note-sheet for player-pianos and the like, having note perforations therein with their advance ends relatively located to sound their notes in desired musical sequence; and characterized by having selected perforations prolonged substantially continuously beyond lengths corresponding to the notations on the score or record from which the sheet is made, said prolongations extending into successive groups of perforations and continuing past the rear ends of certain perforations which are terminated to eliminate their tones from the volume of tone being sustained by said prolongations.

8. A note-sheet for player-pianos and the like, having note perforations therein with their advance ends relatively located to sound their notes in desired musical sequence; and characterized by having selected perforations along the length of the sheet prolonged in succession beyond lengths corresponding to the notation in the score or record from which the sheet is made, said prolongations overlapping following perforations, the successive prolongations cooperating with the perforations overlapped thereby to produce a succession of harmonies having greater respective tone volumes than those indicated on the score or record from which the sheet is made.

9. A note-sheet for player-pianos and the like, having note perforations therein with

their advance ends relatively located to sound their notes in desired musical sequence; and characterized by having the number of perforations concurring transversely of the sheet for sounding each of a plurality of harmonies, augmented above the number corresponding to the score or record from which the sheet is made, by prolongations of preceding perforations, whereby each said harmony is played with a tone volume greater than that indicated by the score or record.

10. A note-sheet for player-pianos and the like, having note perforations therein with their advance ends relatively located to sound their notes in desired musical sequence; having perforations in a pedaled section of the sheet prolonged beyond lengths corresponding to the notation in the score or record from which the sheet is made, to sustain the tones thereof within said pedaled section; and having selected perforations of said section prolonged into a following pedaled section to add at least part of the harmony of said first section to said second section.

11. A note-sheet for player-pianos and the like, having note perforations therein with their advance ends relatively located to sound their notes in desired musical sequence; and having selected perforations prolonged beyond lengths corresponding to the notation in the score or record from which the sheet is made, said prolongations extending far enough to permit audible sympathetic vibration of their strings, and overlapping other perforations to cause such audible sympathetic vibration.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

CHARLES F. STODDARD.

Witnesses:

J. L. B. BYRNE,
G. BERNHARDT.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

It is hereby certified that in Letters Patent No. 1,025,077, granted April 30, 1912, upon the application of Charles F. Stoddard, of Boston, Massachusetts, for an improvement in "Note-Sheets for Player-Pianos and the Like," errors appear in the printed specification requiring correction as follows: Page 1, line 44, for the word "duration" read *durations*; page 2, line 13, for the word "pedal" read *pedaled*; page 3, line 64, for reference-letter "M'" read *m'*; page 4, line 30, for the word "passage" read *passages*; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 4th day of June, A. D., 1912.

[SEAL.]

C. C. BILLINGS,

Acting Commissioner of Patents.

Corrections in Letters Patent No. 1,025,077