

(No Model.)

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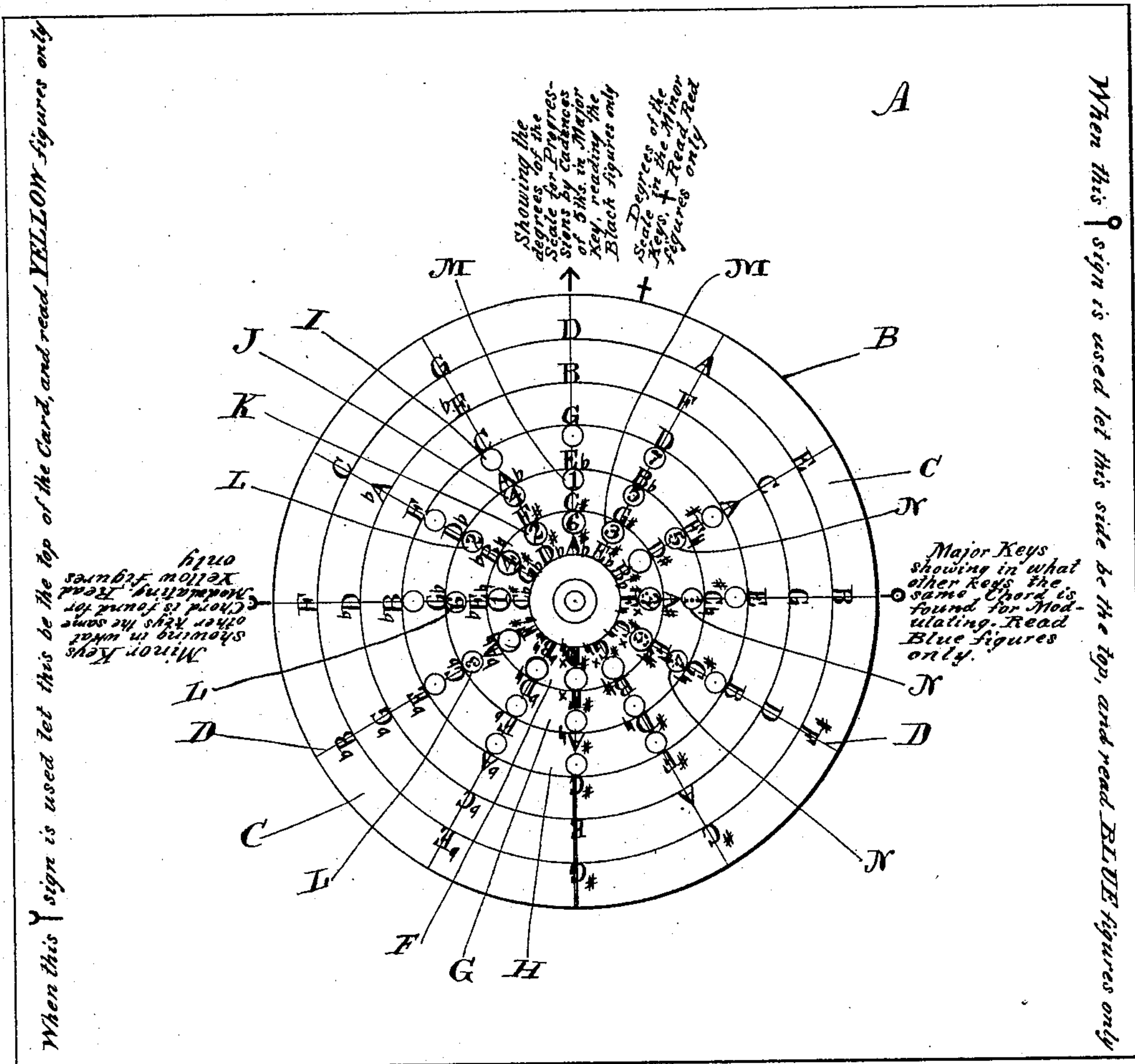
# I. G. WITHERS.

## MUSICAL CHART.

No. 359,829.

Patented Mar. 22, 1887.

*Fig. 1.*



**WITNESSES:**

Donn Titchell.  
c. Sedgwick

**INVENTOR:**

*J. G. Withers*

BY

Munn & Co

**ATTORNEYS.**

(No Model.)

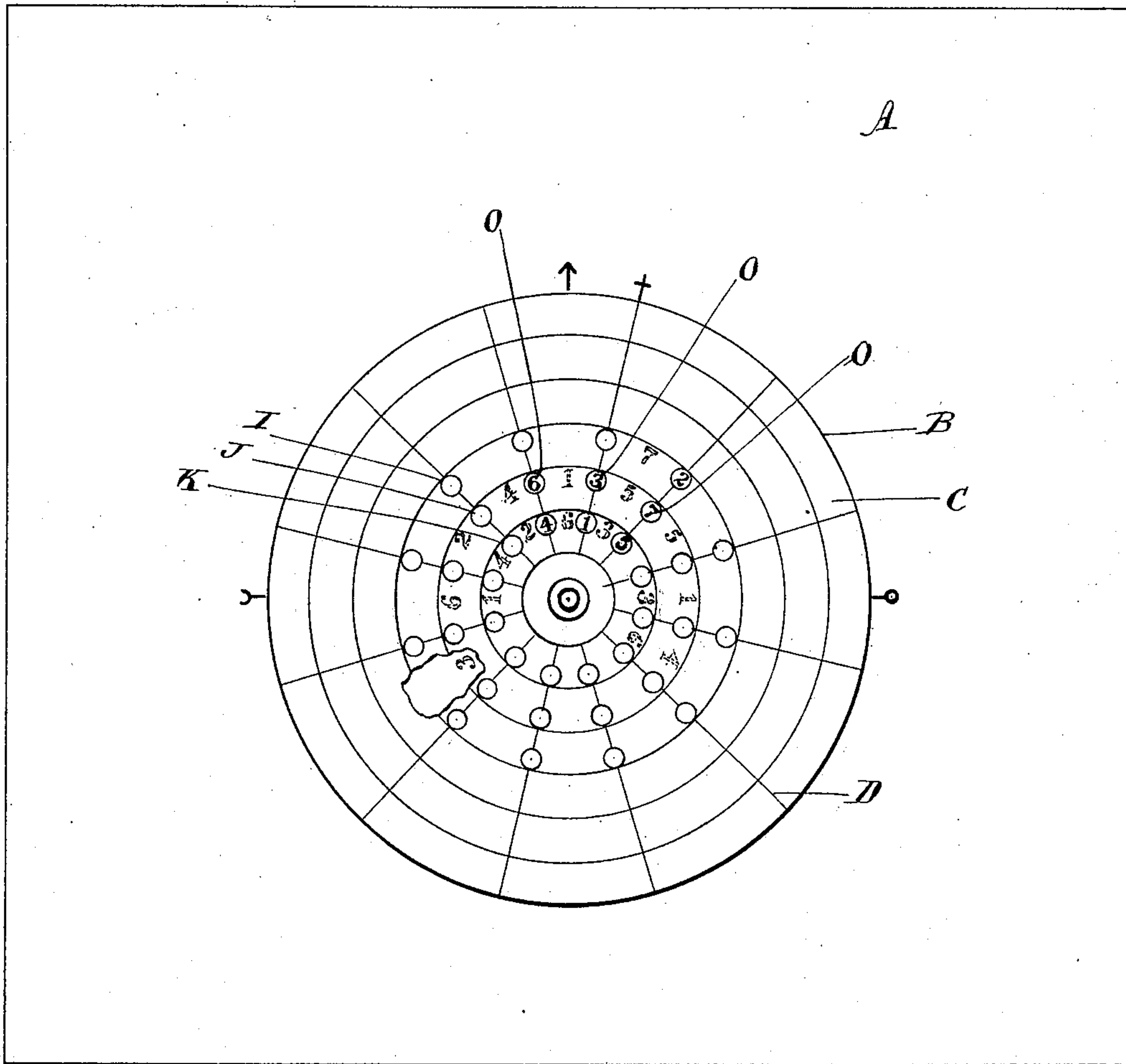
2 Sheets—Sheet 2.

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*Fig. 2.*



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# UNITED STATES PATENT OFFICE.

ISAAC G. WITHERS, OF NEW YORK, N. Y.

## MUSICAL CHART.

SPECIFICATION forming part of Letters Patent No. 359,829, dated March 22, 1887.

Application filed January 15, 1886. Serial No. 188,654. (No model.)

*To all whom it may concern:*

Be it known that I, ISAAC G. WITHERS, of the city, county, and State of New York, have invented a new and Improved Harmony Reference-Chart, of which the following is a full, clear, and exact description.

In music harmony defines a combination of notes sounded together, and all harmonic progression must consist of combinations of sounds in accord.

The object of this invention is to present to a pupil of music an easy and correct means of acquiring a knowledge of the various combinations of musical sounds and the theory employed in producing harmony in music; and it consists in a revolving tablet with certain combinations of the usual letters employed in denoting the different notes and signs used in music printed thereon, in combination with a series of figures correspondingly arranged and printed upon a fixed card beneath, to be read through openings in the revolving tablet, together with certain fixed signs, also printed upon the fixed card, by which the revolving tablet is to be set to produce the different chords, as will be hereinafter described.

Reference is to be had to the accompanying drawings, forming part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 represents a plan of the revolving tablet pivoted to a fixed card, upon which tablet are printed certain combinations of letters employed in designating notes in music, together with the usual signs of sharps, flats, and naturals, and printed upon a fixed card are certain signs and directions by which the dial may be set to register the openings therein with the figures on the fixed card, as will be hereinafter described. Fig. 2 represents a similar view to Fig. 1, showing certain figures printed on the fixed card beneath the revolving tablet through openings in the tablet, and the figures on the card not seen through the openings are represented in dotted lines, with the exception of one, (figure 3,) which appears through a broken space in the tablet.

A in the accompanying drawings represents a fixed card, upon which is centrally pivoted a revolving tablet, B. This revolving tablet B is divided into six concentric spaces, C, denominated "circles," which are divided

transversely into twelve spaces by lines D, radiating from the center or pivot on which the tablet revolves. The first three concentric spaces or circles C from the center of the tablet B are provided with openings I J K on the radiating lines D. These three circles F G H represent the minor, the major, and the diminished circles. Directly beneath the openings I J K upon the fixed card A are certain combinations of figures, printed in this illustration in four different colors, consisting of yellow, black, red, and blue, so that as the tablet B is revolved and a radial line D set at any one of the different fixed signs printed on the card A, hereinafter described, the different-colored figures thereon will be seen through the openings I, J, or K, as the case may be.

On the fixed card A are printed directions and certain signs by which to set the revolving tablet B in position to produce various combinations of notes in the different keys and the degrees of the scale for progression by cadences by reading the different colored figures exposed through the openings I J K, as the case may be, in combination with the letters and signs on the revolving tablet B registering therewith.

The letters printed on the revolving tablet B, indicating the different notes in the combinations, have the usual signs of sharps, flats, naturals, &c., employed in writing music.

On the fixed card A at certain points are printed the following signs, at which the radial lines D are set, in order to form the different combinations of chords desired:

At the top of the card A when this sign ↑ is used, read the following description: "Showing the degrees of the scale for progression by cadences of 5ths in major keys, reading the black figures only."

The sign † indicates degrees of scale in the minor keys. Read red figures only.

The sign ♀ major keys, showing in what other keys the same chord is found for modulating. Read blue figures only.

The sign √ minor keys, showing in what other keys the same chord is found for modulating. Read yellow figures only.

When this sign √ is used, let this be the top of the card A, and read the yellow figures only.

When this sign ♀ is used, let this side be the



top of the card A, and read the blue figures only.

The use of this harmony reference chart may be described as follows: The first circle from the center of the wheel is called the "minor circle." The second circle is called the "major circle." The third circle is called the "diminished circle."

A triad is three different notes placed simultaneously above each other at intervals of a third. Any triad starting from the first circle is a minor triad, and if from the second circle it is a major triad, and from the third circle a diminished triad. A minor triad is composed of a first, minor third, and perfect fifth. A major triad is composed of a first, major third, and perfect fifth. A diminished triad is composed of a first, minor third, and diminished fifth.

As there are seven notes in each scale, there are also seven figures, 1, 2, 3, 4, 5, 6, 7, over their respective notes, (black figures for major keys, red figures for minor keys,) figure 1 always denoting the key, it being the first note of that scale.

Example—scale of C major:

1 2 3 4 5 6 7  
C, D, E, F, G, A, B.

*N. B.*—Read all accidentals, sharps ( $\sharp$ ) and flats ( $\flat$ ), occurring on the left of any note where there is a black or red figure when either of these signs  $\uparrow$   $\dagger$  is used, with this exception, viz: that in the minor scales, (red figures,) if the sixth or seventh of the scale be a raised sixth or seventh, then the accidental on the right of the raised note must be read.

This sign  $\uparrow$  in black with black figures is used for all major keys. The figures in the holes over the letters show the degree of the scale that letter (or note) is found on. The first three letters on the line (reading upward) from where there is a figure corresponding in color to the sign used is the common chord or triad on that degree of scale.

Example: Black figure 1 over C, the first three notes on that line are C, E, G, the chord of the first degree of C major; figure 2 over D, first three notes on that line are D, F, A, chord of the second degree of C major, &c.

This sign  $\dagger$  in red with red figures is used for all minor keys. The same remarks apply as in the above, only that if the sixth or seventh is raised the accidental on the right of those notes must be read.

Set any line on the wheel to this sign  $\uparrow$  and the black figure 1 will appear through the hole over some note in the major circle, showing it to be a major key, and to this sign  $\dagger$  and the red figure 1 will appear through the hole over some note in the minor circle, showing it to be a minor key, 2, 3, 4, 5, 6, 7, over their respective notes of that scale to which the wheel is set, and counting all the sharps ( $\sharp$ ) or flats ( $\flat$ ) occurring on the left of any note (over which there is a figure corresponding to the color of the sign used) will

give the number of sharps ( $\sharp$ ) or flats ( $\flat$ ) used for the signature of that key.

*Chords.*—The first three notes on any line form a common chord, called "triad" or "cadence," and whichever circle the chord starts from determines the nature of that chord, whether it be a minor, major, or diminished chord. The first note on any line is the fundamental bass of that chord, and is also the first of the chord. The second note on the line is the third of the chord, (not the third of the scale.) The third note on the line is the fifth of the chord.

In chords containing more than three different notes the fourth note on the line is the seventh of the chord. The fifth note on the line is the ninth of the chord—a minor ninth if starting from the first circle, a major ninth if starting from the second circle.

There are three principal chords in each key, (either in the major or minor mode,) called, first, the "tonic chord;" second, the "dominant chord;" third, the "subdominant chord." The tonic chord is formed by the first, third, and fifth notes of the scale. (On the wheel it is found to be the first three notes on the line, starting from the note at figure 1, reading upward.) The dominant chord is formed by the fifth, seventh, and second of the scale. (On the wheel it is found to be the first three notes on the lines, starting from the note at figure 5.) The subdominant chord is formed by the fourth, sixth, and first of the scale. (On the wheel it is found to be the first three notes on the line, starting from the note at figure 4.)

*Remark.*—In the dominant chord in the minor mode care must be taken that the accidental on the right of the third of the chord be read.

The dominant seventh chord is the first four notes on the line starting from figure 5. It is composed of the fifth, seventh, second, and fourth notes of the scale.

*Resolution of the dominant seventh chord.*—The resolution of the dominant seventh chord to a tonic chord in a major key is as follows: The first of the dominant remains and becomes the fifth of the tonic. The third of the dominant ascends a half-tone and becomes the first of the tonic. The fifth of the dominant may descend a whole tone and become the first of the tonic, or it may ascend a whole tone and become the third of the tonic. The seventh of the dominant descends a half-tone and becomes the third of the tonic. In its resolution to the tonic in a minor key the fifth of the dominant, if it ascends, must be only a half-tone. The seventh of the dominant descends a whole tone and becomes the third of the tonic.

On the wheel the first of the dominant becomes the fifth of the tonic; the third of the dominant becomes the first of the tonic; the fifth of the dominant becomes the first or third of the tonic; the seventh of the dominant becomes the third of the tonic.



*Enharmonic chord.*—The enharmonic chord usually follows the subdominant chord, and on the wheel it is found to be the first four notes on the lines, starting from the note at figure 4, reading the accidental on the right of the note at figure 4.

Example:  $\overset{4}{F}$  is the subdominant of  $\overset{1}{C}$ , reading the accidental on the right of  $F$ , which is  $F$  sharp, ( $F\sharp$ .) The first four notes on that line are  $F\sharp$ ,  $A$ ,  $C$ , and  $bE$ , (tacit fundamental  $D$ , chord of the minor ninth and seventh on the dominant of  $G$  minor.)

The seventh, second, fourth, and sixth of any regular minor scale is the origin of the enharmonic chord.

Test the above example by setting the wheel to the minor sign  $\dagger$ . The red figure 1 will appear over  $\overset{1}{G}$  in the minor circle, and the letters (or notes) at figures 7, 2, 4, and 6 will be  $F\sharp$ ,  $A$ ,  $C$ , and  $bE$ , more properly a chord of the dominant seventh and minor ninth on a tacit fundamental, composed of a major third, perfect fifth, minor seventh, and minor ninth, 5, 7, 2, 4, 6, 5 being the tacit fundamental minor scale.

*Resolution of the enharmonic chord.*—The resolution of the enharmonic chord, when it follows the subdominant chord and does not change the key by modulating, is as follows: The note at figure 4 (reading the accidental on the right) is the first of the chord, and it ascends a half a tone and becomes the fifth of the tonic chord, and is used as the bass of the tonic chord, being the second inversion of the common chord. The third of the enharmonic chord (second note on the line) descends a whole tone and becomes the fifth of the tonic chord. The fifth of the enharmonic chord remains the same in name and sound and becomes the first of the tonic chord. The seventh of the enharmonic chord ascends a half-tone and becomes the third of the tonic chord.

*Second inversion of the tonic chord marked  $\overset{6}{4}$ .*—This sign  $\phi$  in blue and blue figures is used to show in what other keys and on what degree of the scale of that key the same major chord is found for the purpose of modulating.

Example: The blue figure 1 we will say is over  $C$  in the major circle. The chord is  $C$ ,  $E$ ,  $G$ . The same chord will be found on the third degree of  $A$  minor, fourth degree of  $G$  major, on the fifth degree of  $F$  major or minor, and on the sixth degree of  $E$  minor.

This sign  $\gamma$  in yellow with yellow figures is used to show in what other keys and on what degree of the scale of that key the same minor chord is found.

Example: The yellow figure 1 we will say is over  $A$  in the minor circle, the chord  $A$  minor  $A$ ,  $C$ ,  $E$ . The same chord will be found on the second degree of  $G$  major, third degree of  $F$  major, fourth degree of  $E$  minor, and sixth degree of  $C$  major, when the chord can immediately be considered a triad in another key

upon the degree indicated by the number, and can be proceeded with in conformance with the rules on progression and modulation.

When the double line on the wheel is set to either of the signs  $\uparrow \dagger$  at the top of the chart, then the notes on the first line to the right must be read enharmonically—that is, changing the name of the note, but not its sound; but if the first line to the right of the double line is set to the sign, then the notes on the double line are read enharmonically.

The notes on the double line are  $\sharp D$ ,  $\sharp F$ ,  $\sharp A$ ,  $\sharp C$ ,  $\sharp E$ ,  $\sharp G$ . Enharmonically read they are  $bE$ ,  $bG$ ,  $bB$ ,  $bD$ ,  $bF$ ,  $bA$ . The notes on the first line to the right of the double line are  $bB$ ,  $bD$ ,  $F$ ,  $bA$ ,  $bC$ ,  $bE$ , enharmonical  $\sharp A$ ,  $\sharp C$ ,  $\sharp E$ ,  $\sharp G$ ,  $B$ ,  $\sharp D$ .

Now, let the pupil play upon the piano or write in musical characters this form of the progression of the three principal chords in the key of  $C$  major, with the enharmonic chord introduced in the following order, resolving the dominant seventh and enharmonic chords according to the rule given in the preceeding

example:  $\overset{1}{C}$  in the bass with the left hand. With the right hand play the fifth, first, and third of the tonic chord, which is  $G$ ,  $C$ , and  $E$ .

Then the subdominant chord  $\overset{4}{F}$  in the bass with the left hand. With the right hand play the third, fifth, and first of the subdominant chord, which is  $A$ ,  $C$ , and  $F$ . Then the en-

harmonic chord  $\overset{4}{F\sharp}$  in the bass with the left hand. With the right hand play the third, fifth, and seventh of the enharmonic chord, which is  $A$ ,  $C$ , and  $bE$ , and resolve it, which

will give  $\overset{5}{G}$ , the fifth of the tonic chord for the bass in the left hand being the second inversion of the tonic chord marked  $\overset{6}{4}$ . With the right

hand play the fifth, first, and third of the tonic chord, which is  $G$ ,  $C$ , and  $E$ . Then the dominant seventh chord.  $G$  the first of the dominant seventh chord for the bass in the left hand. With the right hand play the first, third, fifth, and seventh of the dominant seventh chord, which is  $G$ ,  $B$ ,  $D$ , and  $F$ , resolve it to

the tonic chord.  $\overset{1}{C}$  the first of the tonic chord for the bass in the left hand. With the right hand play the fifth, first, and third of the tonic chord, which is  $G$ ,  $C$ , and  $E$ . Try this in all keys, as by the use of the chart all keys are equally simple.

*Special observations relating to the chart, (N. B.)*—Always read the chord upward from the starting-point at any given figure.

Any common chord called triad or cadence is the first three notes on the line, starting from any of these given figures 1, 2, 3, 4, 5, 6, 7.

The tonic chord is the first three notes on the line, starting from figure 1, major or minor key.

The subdominant chord is the first three notes on the line, starting from figure 4, major or minor key.



The dominant chord in a major key is the first three notes on the line, starting from figure 5 in the major circle.

5 The dominant seventh chord in a major key is the first four notes on the line, starting from figure 5 in the major circle.

10 The dominant chord in a minor key is the first three notes on the line, starting from figure 5 in the minor circle, reading the accidental on the right of the seventh of the scale, which is the third of the chord.

15 The dominant seventh chord in a minor key is the first four notes on the line, starting from figure 5 in the minor circle, reading the accidental on the right of the seventh of the scale, which is the third of the chord.

20 The diminished seventh chord is the first four notes on the line, starting from figure 7 in any minor key, reading the accidentals on the right of 7.

The diminished fifth chord is the first three notes on the line, starting from figure 7 in a major key, figure 2 in a minor key, and figure 7 in a minor key.

25 The augmented fifth chord is the first three notes on the line, starting from any note in the major circle, reading the fifth of the chord a half-tone higher.

30 The chord of the seventh on the sensible of a major key, called a "false precadence," is the first four notes on the line, starting from figure 7 in a major key.

35 The chord of the seventh on the sensible of a minor key, called a "minor precadence," is the first four notes on the line, starting from figure 7 in a minor key. (Always read the accidental on the right of 7 in a minor key.)

40 *Note.*—The small accidentals on the right of the notes are used for computing intervals. Use black figure 1 in the major circle. Read all accidentals (sharps or flats) on the left of every note, unless otherwise stated.

45 From the note at figure 1 to the note at figure 2 is a major second; to the accidental on the right and bottom of 2 is a minor second; to the accidental at the right and top of 2 is an augmented second.

50 From the note at figure 1 to the note at figure 3 is a major third; to the accidental at the right and bottom of 3 is a minor third; to the accidental at the right and top of 3 is an aug-

mented third. From the accidental on the right of 1 and at the bottom and right of 3 is a diminished third.

55 From the note at figure 1 to the note at figure 4 is a perfect fourth; to the accidental on the right of 4 is an augmented fourth. From the accidental on the right of the note at figure 1 to the note at figure 4 is a diminished fourth. 60

65 From the note at figure 1 to the note at figure 5 is a perfect fifth; to the accidental on the right of 5 is an augmented fifth. From the accidental on the right of 1 to the letter at figure 5 is a diminished fifth.

70 From the note at figure 1 to the note at figure 6 is a major sixth; to the accidental at the right and top of 6 is an augmented sixth; at the right and bottom of 6 is a minor sixth. From the accidental on the right of 1 to the accidental on the right and bottom of 6 is a diminished sixth.

75 From the note at figure 1 to the note at figure 7 is a major seventh; to the accidental on the right of 7 is a minor seventh. From the accidental on the right of the note at figure 1 to the accidental on the right of the note at figure 7 is a diminished seventh.

80 Having thus described my invention, I claim as new and desire to secure by Letters Patent—

85 A harmony reference-chart consisting of a fixed card, A, upon which are printed certain combinations of figures, and having signs by which the revolving tablet may be set to exhibit the different chords and directions for reading the chart when so set, in combination with a revolving tablet pivoted centrally thereon and divided into a series of concentric circles, these circles divided into spaces by lines radiating from the center or pivot 90 thereof, the first three spaces being provided with openings I J K on the radial lines D, with certain combinations of letters denoting the different notes in music, together with the usual signs of flats, sharps, &c., in music 95 printed thereon, all constructed and arranged substantially as herein described and shown.

ISAAC G. WITHERS.

Witnesses:

EDGAR TATE,

EDWARD M. CLARK.