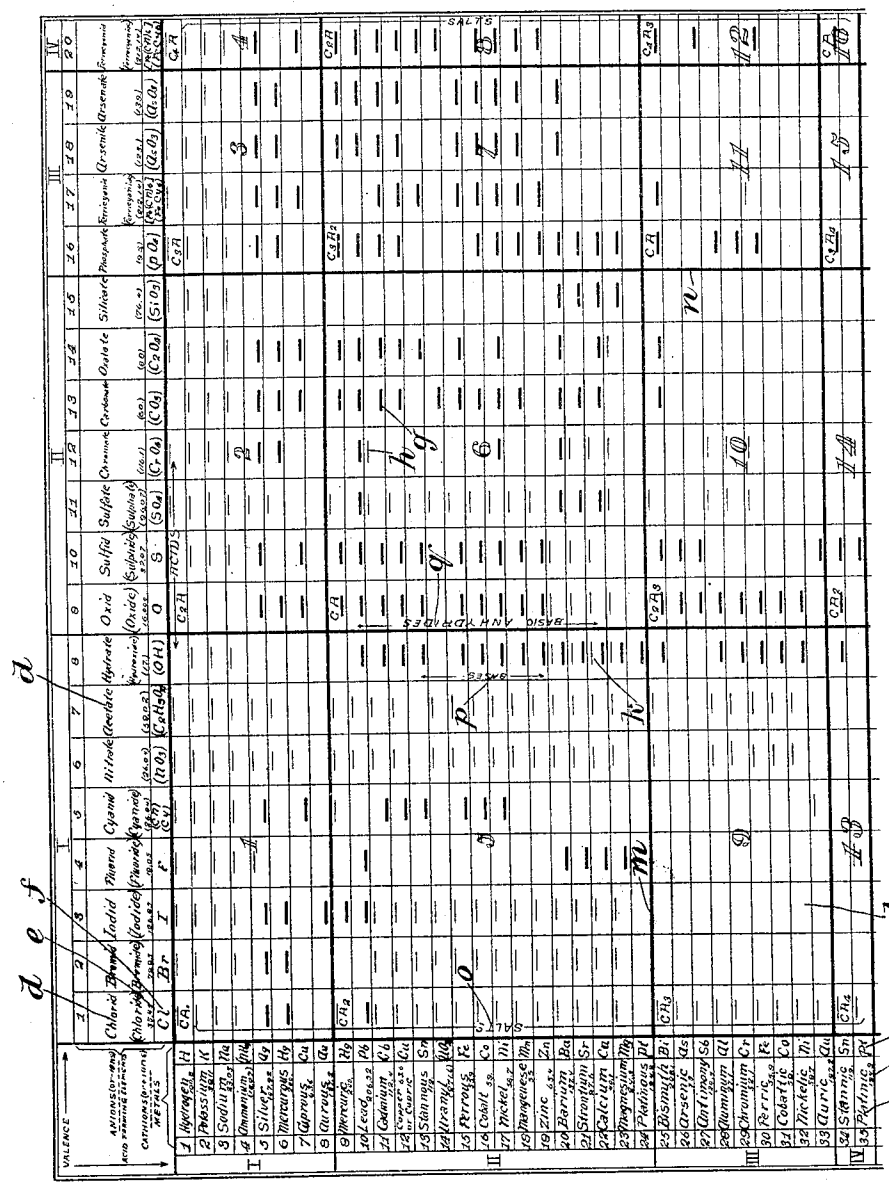
No. 807,203. PATENTED DEC. 12, 1905.

C. D. POORE.

CHEMICAL CHART.

APPLICATION FILED MAR. 17, 1905.



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CHEMICAL CHART.

No. 807,203. Specification of Letters Patent. Patented Dec. 12, 1905.

Application filed March 17, 1905. Serial No 250,601.

To all whom it may concern:

Be it known that I, CHARLES D. POORE, a citizen of the United States, and a resident of Minneapolis, in the county of Hennepin and State of Minnesota, have invented a new and Improved Chemical Chart, of which the following is a full, clear, and exact description.

My invention relates to charts, and more particularly to a chart specially arranged for work in chemistry, the arrangement being such as to assist the investigator in determining the composition of certain compounds in formulating appropriate chemical terminology for compounds of known composition and in studying chemical reactions.

Reference is to be had to the accompanying drawing, forming a part of this specification, in which the figure shows one specimen of my chart, the anions and their symbolic abbreviations being arranged in horizontal columns, and the cathions and their symbolic abbreviations being arranged in vertical columns.

In order to understand the invention, it may be explained that it is desirable to divide all chemical substances as nearly as practicable into two classes—to wit, first, the anions or so-called "acid-forming elements," sometimes designated merely as "negative ions," and, second, cathions (positive ions) consisting of metals and atomic groups acting, chemically, like metals. The several cathions are next represented by appropriate adjectives or descriptive nouns—for instance, ferric being used for iron, cobaltic for cobalt, auric for gold, &c.—and these adjectives or descriptive nouns are arranged in a vertical column, as shown at the left of the figure, being preferably arranged according to the atomic or ionic weight of the different cathions represented—that is to say, the several terms hydrogen, potassium, sodium, ferric, auric, &c., represented by the letter *a*, are accompanied by their respective weights, considered as cathions, these weights of course being ultimately based upon the atomic weight of the different elements represented. The symbols H, K, Na, &c., are arranged in a vertical column *b* immediately to the right of the column of cathions in the manner well known in chemistry. The decimal units *c* denote the cathion-weights, which are derived from the atomic weights of the cathions. The anions *d* are arranged in a horizontal column, as shown at the top of the figure, each being accompanied by numerals *e*, preferably decimal units, expressing the relative weights of the complete anions, which, as before, are ultimately based upon the atomic weights of the elements constituting the anions. Below the names of the anions are symbols *f*, such as Cl, Br, I, &c., these symbols representing the anions and having the usual significance they would possess in ordinary chemistry.

The bulk of the chart is divided up into squares numbered "1" to "16," inclusive, these squares being separated by comparatively heavy lines *m n*, being thus arranged in natural groups representing groups of compounds of allied substances—that is, substances having similar formulæ. As a ready index or guide in writing the chemical formulæ of these various substances each of the numbered squares is provided with an index "CA," "CA_2," "CA_3," "C_2A," "C_4A_3," &c., these indexes representing the relative numbers of cathions and anions comprising the substances found in the several groups represented by the respective squares. For instance, in square No. 1 all of the substances contain one cathion for each anion, so that the index for this square is "CA," ("C" standing for cathion and "A" for anion,) whereas in square No. 7 each of the substances contains two anions for three cathions. Hence the symbol "C_3A_2," the subfigures "3" and "2" denoting the number of times cathions and anions, respectively, are to be taken in all formulæ of substances falling in that square. The several squares "1" to "16" are subdivided into smaller squares *l*, and in each of the smaller squares may be written a light dash *h*, a heavy dash *g*, or two dashes *k*, according to whether the compound relating to that particular square be soluble, insoluble, or partly soluble.

My invention is used as follows: Suppose, for instance, it be desired to write the formula of a given chemical compound. I would follow down the column of cathions *a* until I reached the adjective corresponding to the metal of the compound and would write this adjective upon a separate piece of paper. Next I would follow the horizontal column of anions *d* until I reached the symbol *f* found in the name of the substance as given. Then I write the formula *d* corresponding with the symbol thus discovered. For instance, we are given a formula $AgNO_3$. We find that Ag in the left vertical column is "silver" and NO_3 in the horizontal column is "nitrate." Hence we determine the name of the compound given us to be silver nitrate. Suppose, now, that we are given the name of the

compound only and wish to ascertain its chemical formula. Taking potassium-nitrate as an example, we find it in the column of cathions and "nitrate" in the column of anions, and prefixing the anion formula to the cathion formula we have KNO_3. From the above it is apparent that any person, even if unfamiliar with the general principles of chemistry, can determine, at least in many cases commonly arising, either the formula of a compound, having no data except the name of the compound, or vice versa, can determine the name of the compound from this formula.

A beginner in the study of chemistry making use of this chart finds it very useful for the reason that it makes easy many things which would otherwise be puzzling. From practical experience I have found that it increases rather than reduces the interest taken in chemistry by a beginner. The chart being based upon system and order, it necessarily carries the mind of the investigator through a course of reasoning which, in an indirect way, impresses upon the mind the orderly and definite nature of the chemical substances. Even if the institutions of instruction do not see proper to use the chart for the instruction of pupils it admits of many practical uses to the busy chemist in saving his time.

The Roman numerals I II III IV at the left and at the top of the figure represent the respective valances of the cathions and anions. The salts, bases, basic anhydrids, &c., are also indicated upon the chart, as shown at *o*, *p*, and *q*.

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

A chemical chart, comprising a number of designations indicating anions and arranged in a column, a number of designations indicating cathions and arranged in another column, a number of symbols representing the valance values of said anions, a number of other symbols representing the valance values of said cathions, and a number of distinct squares related to said valances of said cathions and to said valances of said anions for the purpose of exhibiting the characteristics of compounds formed by said anions and said cathions.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CHAS. D. POORE.

Witnesses:
WM. H. MERRIMAN,
EDWARD JOHNSON.