Specification of William Edward Newton : preparing hydrate of magnesia.

A.D. 1874, 21st *May.* N° 1810.

SPECIFICATION

OF

WILLIAM EDWARD NEWTON.

PREPARING HYDRATE OF MAGNESIA.

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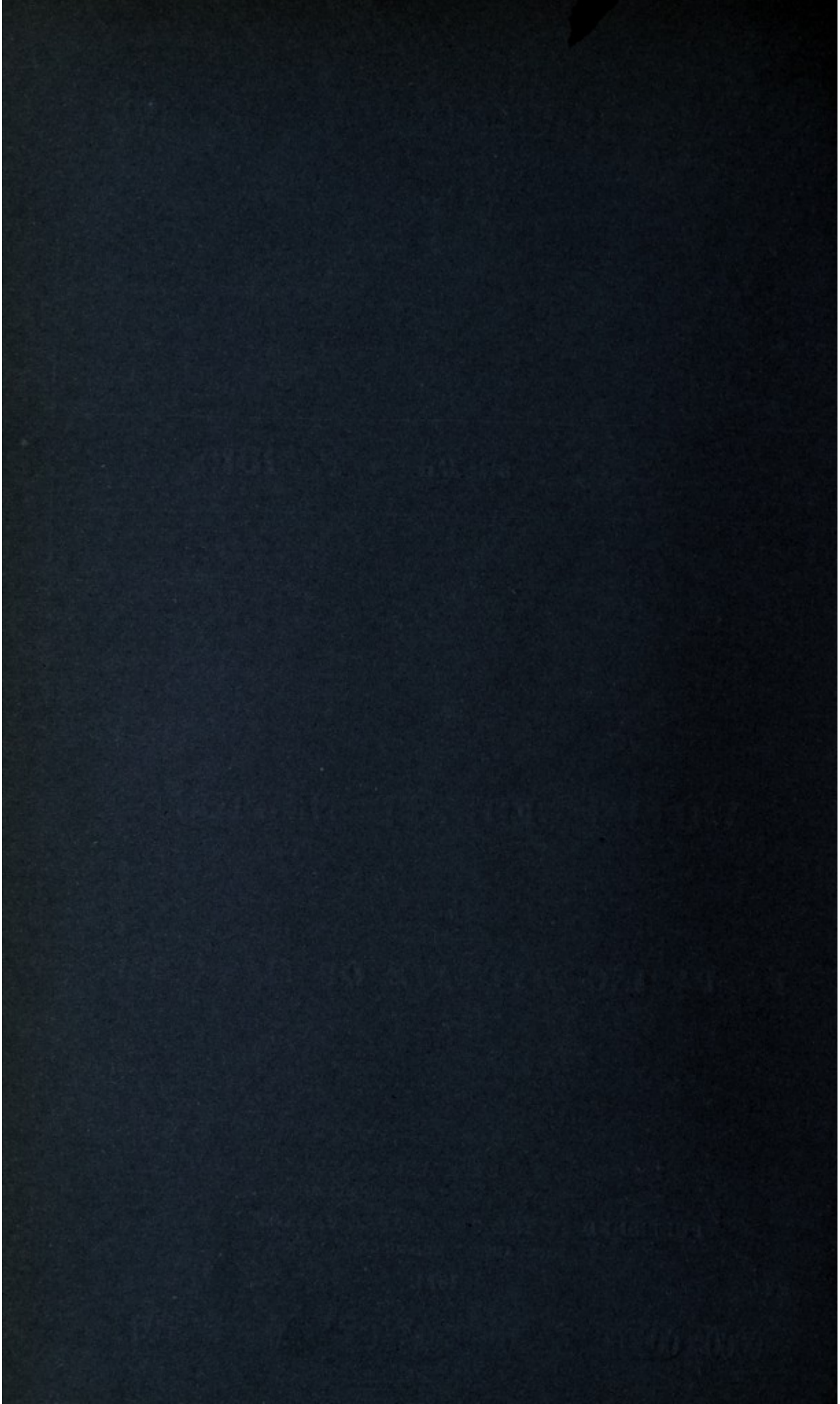

A.D. 1874, 21st MAY. N° 1810.

Preparing Hydrate of Magnesia.

LETTERS PATENT to William Edward Newton, of the Office for Patents, 66, Chancery Lane, in the County of Middlesex, Civil Engineer, for the Invention of "AN IMPROVED PROCESS FOR PREPARING HYDRATE OF MAGNESIA."—A communication from abroad by Charles H. Phillips, of the City and State of New York, United States of America.

Sealed the 14th August 1874, and dated the 21st May 1874.

PROVISIONAL SPECIFICATION left by the said William Edward Newton at the Office of the Commissioners of Patents, with his Petition, on the 21st May 1874.

I, WILLIAM EDWARD NEWTON, of the Office for Patents, 66, Chancery Lane, in the County of Middlesex, Civil Engineer, do hereby declare the nature of the said Invention for "AN IMPROVED PROCESS FOR PREPARING HYDRATE OF MAGNESIA," to be as follows:—

The object of this Invention is to produce an improved medicinal compound consisting of a hydrate of magnesia which the Inventor

denominates "milk of magnesia." This is effected by causing a solution of ammonia to act on and decompose any suitable soluble salt or compound of magnesia, so as to precipitate all the magnesia in the form of an hydrate.

The magnesia compounds which it is preferred to use for the purposes of the Invention are the chloride or the sulphate. The magnesian salt should be dissolved in water, and the solution of ammonia may then be added gradually, during which time the mixture must be kept constantly stirred in order to prevent coagulation. The ammonia is added until complete reaction has taken place, and the magnesian salt has become perfectly decomposed. The mixture is then to be allowed to stand for twenty-four hours, more or less, to settle, when the supernatant liquor may be drawn off. The residuum or precipitate consisting of a hydrate of magnesia is then washed repeatedly until the product is rendered pure.

SPECIFICATION in pursuance of the conditions of the Letters Patent, filed by the said William Edward Newton in the Great Seal Patent Office on the 20th November 1874.

TO ALL TO WHOM THESE PRESENTS SHALL COME, I, WILLIAM EDWARD NEWTON, of the Office for Patents, 66, Chancery Lane, in the County of Middlesex, Civil Engineer, send greeting.

WHEREAS Her most Excellent Majesty Queen Victoria, by Her Letters Patent, bearing date the Twenty-first day of May, in the year of our Lord One thousand eight hundred and seventy-four, in the thirty-seventh year of Her reign, did, for Herself, Her heirs and successors, give and grant unto me, the said William Edward Newton, Her special licence that I, the said William Edward Newton, my executors, administrators, and assigns, or such others as I, the said William Edward Newton, my executors, administrators, and assigns, should at any time agree with, and no others, from time to time and at all times thereafter during the term therein expressed, should and lawfully might make, use, exercise, and vend, within the United Kingdom of Great Britain and Ireland, the Channel Islands, and Isle of Man, an Invention for "AN IMPROVED

PROCESS FOR PREPARING HYDRATE OF MAGNESIA," being a communication to me abroad by Charles H. Phillips, of the City and State of New York, United States of America, upon the condition (amongst others) that I, the said William Edward Newton, my executors, or administrators, by an instrument in writing under my, or their, or one of their hands and seals, should particularly describe and ascertain the nature of the said Invention, and in what manner the same was to be performed, and cause the same to be filed in the Great Seal Patent Office within six calendar months next and immediately after the date of the said Letters Patent.

NOW KNOW YE, that I, the said William Edward Newton, do hereby declare the nature of the said Invention, and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement (that is to say) :—

This Invention relates to improvements in the mode of making the medical compound termed "milk of magnesia," for which I obtained Letters Patent dated January Sixth, One thousand eight hundred and seventy-four, No. 72, and which compound consists of a pure hydrate of the oxide of magnesium suspended in water. As previously prepared great difficulty was experienced in making it so as to get it absolutely free from the remnants of the sulphates of the alkalies used in precipitating the magnesia from its form as a sulphate or chloride to its desired form as a hydrate in a pure state. To facilitate this process is the object of the present Invention, which consists in resolving the magnesia from its state as a sulphate or other soluble salt of magnesia to a hydrate by the aid of ammonia, preferably liquor ammoniæ, or a solution of the carbonate of ammonia.

To make one hundred gallons of the "milk of magnesia" by the improved process, I take one hundred and twenty-five pounds of the pure sulphate of magnesia and dissolve the same in about two hundred gallons of distilled water, filtering it through paper if considered necessary or desirable. To this is then added sufficient liquor of ammonia to free and precipitate the magnesia from the sulphuric acid with which it is combined. For this purpose from thirty to eighty pounds of the liquor of ammonia, according to the strength of the preparation, are requisite to produce the desired result.

Newton's Improved Process for Preparing Hydrate of Magnesia.

Where liquor ammoniæ fortior containing some twenty-six and one half per cent. of ammonia is used from thirty to forty pounds will be found amply sufficient for the purpose; but when simple liquor ammoniæ is used containing about ten and a half per cent. of ammonia it will take from two to three times as many pounds to produce the same result. In each case however sufficient should be used to insure the thorough precipitation of the magnesia, and for this purpose it is better to dilute the ammonia with a sufficiency of water to prevent evaporation before it combines with the sulphuric acid of the magnesia.

The materials above mentioned having been thoroughly mixed with each other they may, if desired, be subjected to heat through the aid of steam in the manner employed and described in the Specification of the Patent above referred to.

Whether or not heat be used sufficient agitation must be employed to prevent the coagulation of the magnesia on the bottom and sides of the vessel. When this has been done the solution and mixture may be allowed to settle, as a rule twenty-four hours, or thereabouts, will be found amply sufficient for the purpose. The clear liquor containing a portion of the resultant sulphate of ammonia is then drawn off, and more distilled water added in quantity sufficient to replace the liquor withdrawn, and the mass is agitated for ten minutes to half an hour, and again allowed to settle, when it may be drawn off as before. This operation may be repeated for three or four times more when it will be found sufficiently pure for the purpose desired.

The sulphate of ammonia being much more easily removed by washing than the resultant solution of the sulphates of soda and potash of the aforesaid patented process, the use of ammonia materially lessens the time, labor, and expense of the process.

Or instead of simply using cold water for the washing process, heat with agitation may be employed either in the form of steam, or in any other suitable form, in which case the boiling may be sufficiently prolonged during one or two washings to entirely expel the sulphate of ammonia, thereby leaving nothing behind but the hydrate of magnesia (in its pure form) suspended in the water; but if desired it may be washed once or twice more to insure the utmost purity of the product.

Newton's Improved Process for Preparing Hydrate of Magnesia.

Or instead of using liquor ammoniæ as the means of forming the hydrate of magnesia, the carbonate of sesqui-carbonate of ammonia may be substituted therefor, in which case enough must be taken to entirely precipitate the magnesia. From sixty to eighty pounds will be found sufficient for the purpose for every one hundred and twenty-five pounds of the sulphate of magnesia taken. And as the most of the ammonia can be reclaimed, whether as a sulphate or carbonate, or as ammoniacal gas, by subjecting the clear liquor when drawn off to any of the well-known processes for its manufacture in a condensed form it may (at little cost) be used in excess so as to insure a perfect precipitation of the whole of the magnesia.

When the carbonate is used it is better to use a moderate degree of heat at first to effect the precipitation of the magnesia, after which it may be brought to the boiling point and continued for a few minutes, which will effect a thorough chemical dissolution of the sulphate of magnesia, resolving it into a hydrate and forming simultaneously therewith a sulphate of ammonia, and setting free the carbonic acid with which the ammonia was previously charged.

If desired the boiling process may be prolonged sufficiently long to expel all the sulphate of ammonia, after which the magnesia may be allowed to settle as before, the liquor drawn off, and the magnesia then washed twice or three times with distilled water, either cold or with heat, and with agitation, each time allowing it to settle, and then drawing off the liquor, until it has been sufficiently washed to remove all trace of the ammonia or other impurities with which it may have been charged or mixed.

When the ammonia is driven off by boiling directly from the magnesia after the reaction has taken place, the vat or boiler in which the mixture is contained should be provided with a suitable cover and worm through which the products of distillation may be conducted into the receiver in which the ammonia is to be reclaimed. The boiling need not continue longer than is absolutely necessary to expel the ammonia. The sulphate and excess of other kinds of ammonia thus driven off may be condensed in any known way, and afterwards treated with soda or other suitable material to set free the ammoniacal gas, and which being again condensed in water will form the necessary liquor ammoniæ for

the next vat full of magnesia which is to be reduced to the state of a hydrate. Thus, the same ammonia may be used over and over again, but little additional fresh ammonia being required for each new vat full of the magnesian solution. The pure hydrate of magnesia thus obtained is then mixed with the necessary amount of pure distilled water to make it of the consistency required, and which is termed "milk of magnesia," each one hundred and twenty-five pounds of the sulphate yielding about one hundred gallons of "milk of magnesia" of the consistency required. About twenty grains of the pure hydrate will be found in every fluid ounce of the so-called "milk of magnesia;" but it may be charged with more or less as required by simply increasing or diminishing the quantity of water with which it is mixed.

If absolute purity of the hydrate is required the process of washing the magnesia may be repeated as often as may be deemed necessary; but for all practical purposes (when heat is applied) two or three washings will be found abundantly sufficient to remove any reasonable amount of excess of the ammonia used for the precipitation of the hydrate of magnesia, or the removal of its resultant sulphate.

Instead of using the sulphate of magnesia as the source of procuring the hydrate, any other pure soluble salt of magnesia may be used, such as the chloride of magnesium, simply taking care to use a sufficiency of the ammonia to effect the necessary chemical change, the resultant mixture being treated in precisely the same manner as before. The only difference in the process when the chloride is used is the formation of a hydrate of magnesia, and a muriate instead of a sulphate of ammonia. The sulphate of magnesia is however preferred, as there is a more abundant source of the raw material than there is of the other.

Having now described the Invention which has been communicated to me by my foreign correspondent, and having explained the manner of carrying the same into effect, I claim as the Invention secured to me by Letters Patent as aforesaid, the process herein described of preparing hydrate of magnesia, to wit, by subjecting a soluble salt of magnesia to the action of ammonia or carbonate of ammonia, as herein set forth.

I also claim, preparing a milk of magnesia from such hydrate so

obtained by mixing the hydrate of magnesia with a suitable quantity of distilled water, as described.

In witness whereof, I, the said William Edward Newton, have hereunto set my hand and seal, the Tenth day of November, in the year of our Lord One thousand eight hundred and seventy-four.

W. E. NEWTON. (L.S.)

LONDON:
Printed by GEORGE EDWARD EYRE and WILLIAM SPOTTISWOODE,
Printers to the Queen's most Excellent Majesty. 1874.