

UNITED STATES PATENT OFFICE.

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PILLS FOR THE TREATMENT OF DIABETES MELLITUS.

960,914.

Specification of Letters Patent.

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No Drawing.

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To all whom it may concern:

Be it known that I, ARTHUR HEINEMANN, a subject of the Emperor of Germany, residing at 60 Carlton Mansions, Portsdown Road, Maida Vale, London, W., England, have invented new and useful Improvements in Pills for the Treatment of Diabetes Mellitus, of which the following is a specification.

10 Diabetes mellitus is a chronic disease of metabolism in which the carbohydrates contained in the food and drink taken by the sufferer are converted into glucose and pass into the urine without contributing to the
15 nourishment of the body. In a further phase of the disease sugar is also formed from the albuminous and fatty substances of the body and excreted. The symptoms of the disease are therefore hyperglycemia and consequently glycosuria, while the blood becomes abnormally acidified. This latter
20 fact undoubtedly indicates that diabetes originates in the tissue cells themselves, that is to say is due to an abnormal or pathological condition of the tissues. Further as
25 the various parts of the body, such as the different tissues, glands, nerves and organs, depend upon the blood for their proper functions it necessarily follows that if the
30 blood can not supply the proper nourishment to said parts the latter will become defective and the blood become charged with abnormal or poisonous matter.

To combat a disease it is necessary to remove its cause. This is effected by the introduction into the blood of a particular substance which in the case of diabetes mellitus must be such as will enable the blood to regain its ability to split up and oxidize the
40 glucose.

The blood, like every other organic matter of vegetable or animal origin, contains enzymes which perform the necessary chemical changes. In the case of diabetes mellitus the blood of the sufferer is not of the proper composition and does not contain
45 either the right or sufficient quantity of enzymes to properly oxidize and assimilate the carbohydrates.

50 According to my invention I substitute for the natural enzymes, which should be present in the blood, vegetable enzymes,—the so-called oxydases and peroxydases—which under certain conditions split up and
55 oxidize the glucose, the products of which are then utilized for the nourishment of the

body. But as these enzymes only act in a weak acid or neutral solution and still better in an alkaline solution, and the acid condition of the blood of a diabetic patient is
60 such as to destroy the function,—namely the possibility of utilizing sugar—of even the natural blood enzymes it is necessary to diminish or remove the acidity of the blood. For this purpose I mix the vegetable en-
65 zymes with finely pulverized alkaline salts. The vegetable enzymes and alkaline salts are then formed into pills and coated with keratin or the like, so as to prevent the acids present in the stomach from either reduc-
70 ing or totally annulling the effect of the alkaline enzyme mixture. The pill passes unchanged into the duodenum where it is dissolved by the alkaline liquid present in the intestine. It is then absorbed and passes
75 into the blood, the abnormal amount of acid in the latter being neutralized, so that the natural enzymes of the blood as well as the artificially added enzymes are able to work
80 under physiological conditions and split up and oxidize the sugar compounds, thus enabling the latter to contribute to the nourishment of the body.

Experience has shown that nearly all vegetable enzymes having an oxidizing effect
85 upon the carbohydrates are useful for the above named purpose, especially the oxydases and peroxydases of the genera cucurbita, cochlearia and beta. As regards the alkaline salts to be used those readily ab-
90 sorbed in the intestine such, for instance, as the carbonates of lithium, sodium, potassium and magnesium, and the oxid and peroxid of magnesium should be employed. Since a
95 peroxydase only acts in the presence of peroxid compounds, it is necessary to always use a peroxid, for example dioxid of magnesium with the peroxydases. The enzyme is prepared from the plant in any suitable
100 or well known manner, such as the following. The leaves, roots or other parts of the plant are macerated, either with or without the addition of water, and then if required slightly fermented. The liquid so obtained
105 which contains the enzyme in solution is then filtered and the enzyme successively precipitated and purified by alcohol, ether or other suitable means. This constituent is like the corresponding constituent found
110 in yeast and is now known by the same name viz. zymase. The precipitated enzyme or the liquid zymase, as the case may be,

is then mixed with the necessary proportion of alkaline salts and formed into pills, which are then coated with keratin or other substance incapable of being dissolved by the gastric juice present in the stomach. The pills can be provided with a second coating of such nature as to make them palatable.

In the case of the genus "beta" the invention could be carried out in the following manner: A suitable quantity of common sugar beets, such for example as 10 kilos is thoroughly cleaned, reduced to a pulp and then subjected to a pressure of, say, 300 atmospheres by means of a suitable hydraulic press. The liquid obtained by this operation, about 7 liters, is then poured into a vessel and mixed with 700 c. c. m. of alcohol of 96% purity, so as to precipitate the sugar and mucous substance contained in the mixture. The liquid in said vessel is removed and filtered, and 45 liters of absolute alcohol added to the filtrate. The resultant precipitate is filtered and washed with a little absolute alcohol and then placed in a closed vessel. The alcohol is then evaporated preferably at a temperature of about 20° to 30° C. by the withdrawal, by any suitable apparatus, of the air contained in said vessel. The dry powder resulting from the last step, which weighs about 20 grams, is then mixed with

20 grams of magnesium peroxid, 20 grams of lithium carbonate, and 4.8 grams of magnesium oxid. This mixture will be sufficient to form 400 pills or tablets of 0.162 gram, or 2½ grains, each.

I wish it to be understood that although I have in the foregoing description advisedly used the word pill it is obvious that the mixture of vegetable enzymes and alkaline salts may be pressed into the form of small tablets.

Having described my invention, what I claim and desire to secure by Letters Patent is:—

1. Pills for the treatment of diabetes mellitus containing a compressed mixture of oxydases and an alkaline salt provided with a coating consisting of a substance insoluble by the gastric juices of the stomach, substantially as described.

2. Pills for the treatment of diabetes mellitus containing a compressed mixture of oxydases of the genus beta and an alkaline salt provided with a coating of keratin, substantially as described.

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

ARTHUR HEINEMANN.

Witnesses:

ARTHUR F. ENNIS,
F. L. RANDS.