No. 692,020. Patented Jan. 28, 1902.

M. LAMBERT.

PROCESS OF DISSOLVING LOW GRADE SUGAR.

(Application filed Nov. 10, 1900.)

(No Model.) 2 Sheets—Sheet 1.

FIG. 1.

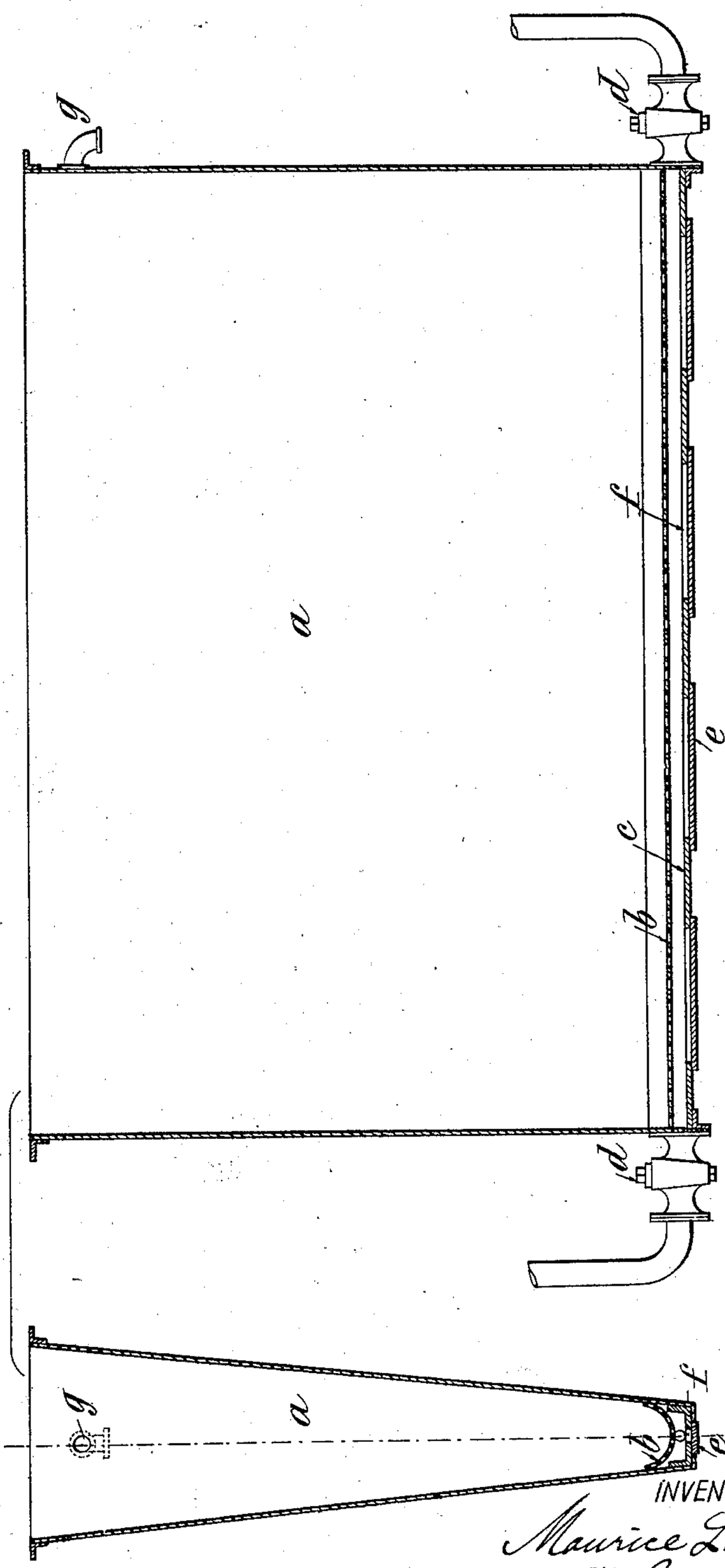

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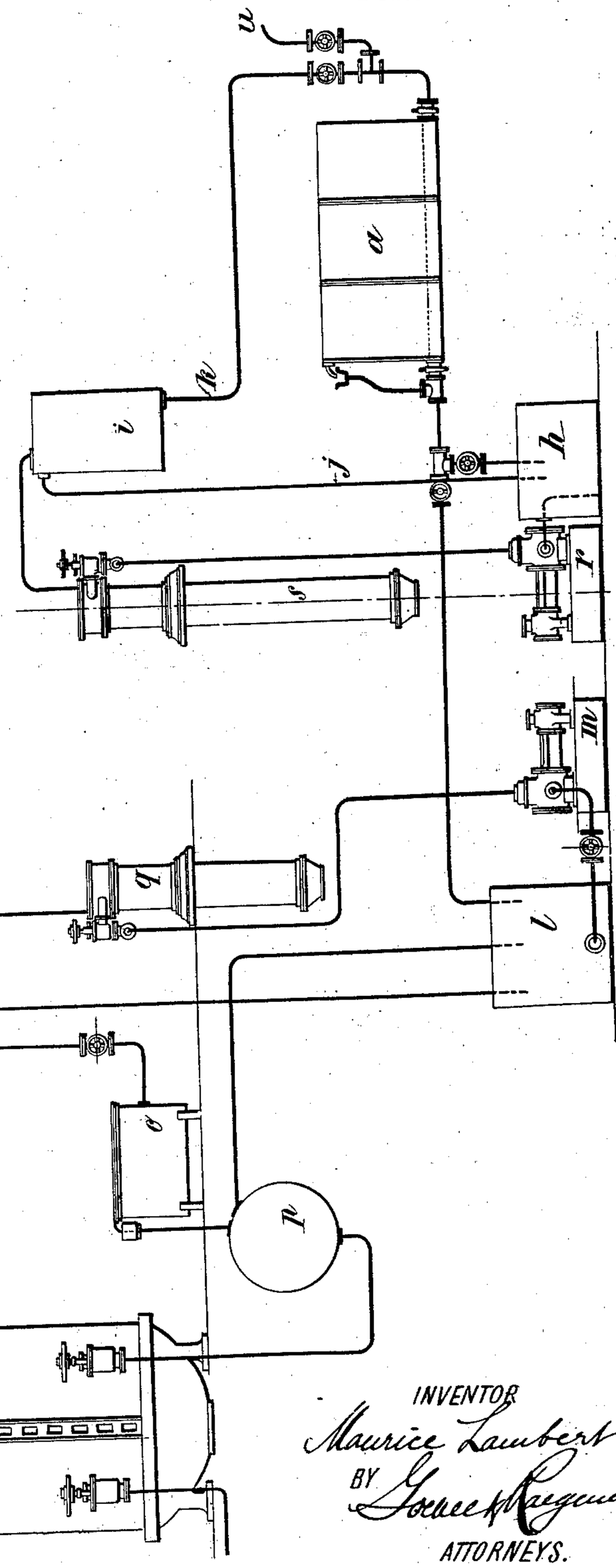
FIG. 2.



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PROCESS OF DISSOLVING LOW-GRADE SUGAR.

SPECIFICATION forming part of Letters Patent No. 692,020, dated January 28, 1902.

Application filed November 10, 1900. Serial No. 36,017. (No specimens.)

To all whom it may concern:

Be it known that I, MAURICE LAMBERT, a citizen of the Republic of France, residing at Toury, Eure-et-Loir, France, have invented certain new and useful Improvements in Processes of Dissolving Low-Grade Sugar, of which the following is a specification.

This invention relates to improvements in processes of crystallizing a crystallizable substance out of its solutions; and the object of the invention is to provide a process by which the operation may be economically conducted and a product of uniform character obtained.

The process is particularly adapted for use in the art of sugar manufacture.

According to a well-known method of purifying an impure sugar solution a quantity of lime is added to the solution, and after having been well mixed the solution is heated and carbonic-acid gas passed through the same, the latter step being commonly known as "saturation." The solution is then filtered and the resulting comparatively pure fresh sugar solution is thereafter boiled down in suitable vessels and finally boiled to grain. The mass (now termed "masse-cuite") is removed from the pan and subjected to any suitable treatment for separating the crystallized sugar from the molasses. This may be effected by working the masse-cuite in a centrifugal or placing the same in crystallizers, these usually being vessels of such form as to expose a large surface to cooling and usually tapering from the upper toward the lower portion, the narrower lower portion being provided with means for drawing off the molasses. Whatever method be pursued the result is commonly known as "first sugar" and "first molasses." The first molasses is then boiled, and in case the molasses is a rich one it may be boiled to grain. The sugar is separated from the molasses, and the result of this step is "second sugar" and "second molasses." A "third sugar" may by proper working and under favorable conditions be extracted from the second molasses.

The present process is particularly suited for treatment of the second sugar, whether produced in the manner referred to or otherwise. It has heretofore been proposed to run through the second sugar after the same has throughly drained in the crystallizer a quantity of fresh sugar solution—that is to say, the sugar solution resulting from the saturation step and subsequent filtration. By this operation the second sugar is melted and enters into the fresh solution. The syrup thus formed is then filtered and boiled down to grain and the sugar separated from the molasses by any suitable means. The resulting sugar is very much whiter and of better quality than the original second sugar. In practice it has been found difficult to carry on the process referred to with complete success on account of the difficulties experienced in obtaining a syrup of high and uniform density—*i. e.*, sugar content—upon melting down the second sugar. It has been the practice to pass a current of the fresh solution in heated condition into the crystallizer at one end at the bottom and permit the exit of the syrup from an overflow provided for the purpose in the upper part of the crystallizer. In practice it has been found that if the quantity of fresh solution thus employed is small, so as to obtain a syrup of the required concentration, the compact mass of sugar at the bottom of the crystallizer is not sufficiently attacked and melted away, owing to its compactness. Furthermore, the solution cools down rapidly, and thereby protracts the melting to an extent seriously interfering with the economy of the process. When, on the other hand, a larger quantity of juice is employed, whereby these difficulties are to some extent overcome, the resulting syrup is of too low density to be sent to the boiling-pans, for which purpose a syrup of from 25° to 30° Baumé is necessary. The present invention as applied to this method of sugar manufacture overcomes entirely these objectionable features; and the invention as thus applied consists of the process herein described of producing a highly-concentrated sugar-syrup, which comprises the steps of passing through a mass of second sugar a quantity of fresh sugar solution in heated condition, whereby a portion of said second sugar is melted and dissolved in said sugar solution, reheating the syrup thus produced, passing the same again through the second sugar, and continuing the circulation and reheating at each pass until said syrup attains the desired degree of concentration.

In the accompanying drawings, Figure 1 illustrates a crystallizer adapted for use in the process; and Fig. 2 shows in diagram a connected apparatus, including the crystallizer, for carrying on the process.

Similar letters of reference indicate corresponding parts.

The crystallizer *a* is provided with a false bottom *b* and with a lower bottom *c*, provided with orifices *f*, which can be closed by suitable plugs or covers *e*. A quantity of a mixture of second sugar and second molasses is placed in the crystallizer *a*, the apertures *f* opened, and the molasses allowed to drain off. The openings *f* are then closed. A quantity of heated fresh sugar solution supplied by an inlet-pipe *u* is allowed to enter the crystallizer. It melts and dissolves a portion of the sugar, and the resulting syrup flows out at the overflow at the upper part of the crystallizer and thence into a suitable reservoir *h*. The syrup collected in the reservoir *h* is then pumped by a pump *r* through a tubular or serpentine reheater *s*. The syrup thus reheated is collected in a vessel *i*, standing at a higher level than the crystallizer, and said vessel *i* communicates by means of a pipe *k* with the crystallizer *a* and by means of an overflow *j* with the intermediate reservoir *h*. By the operation of the pump *r* the liquid is continuously circulated through crystallizer *a*, tank *h*, pump *r*, reheater *s*, and tank *i* and constantly increases in sugar content. The overflow of the vessel *i* is always in operation to a small extent. When the syrup resulting from this remelting attains the desired density—say about 30° Baumé at a temperature of 15° centigrade—it is permitted to flow into a second intermediate reservoir *l*, from which it is pumped by a pump *m* through a reheater *q* and thence into an elevated tank *n*, provided with an overflow into the reservoir *l* and connected by a pipe with the filter *o*. The syrup flows through the filter *o* into a suitable storage vessel *p*, which is also provided with an overflow into the reservoir *l*. A small overflow continually takes place from the vessels *n* and *p* into the intermediate reservoir *l*. From the vessel *p* the syrup is conducted into the vacuum-pan *t* for boiling.

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

The process herein described of producing a highly-concentrated sugar-syrup, which consists in passing through a mass of second sugar a quantity of fresh sugar solution, in heated condition, whereby a portion of said second sugar is melted and dissolved in said sugar solution, reheating the syrup thus produced, passing the same again through the second sugar, and continuously circulating said syrup and reheating the same at each pass, through the second sugar, until said syrup attains the desired degree of concentration, substantially as set forth.

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

MAURICE LAMBERT.

Witnesses:
EMILE LEDRET,
EDWARD P. MACLEAN.