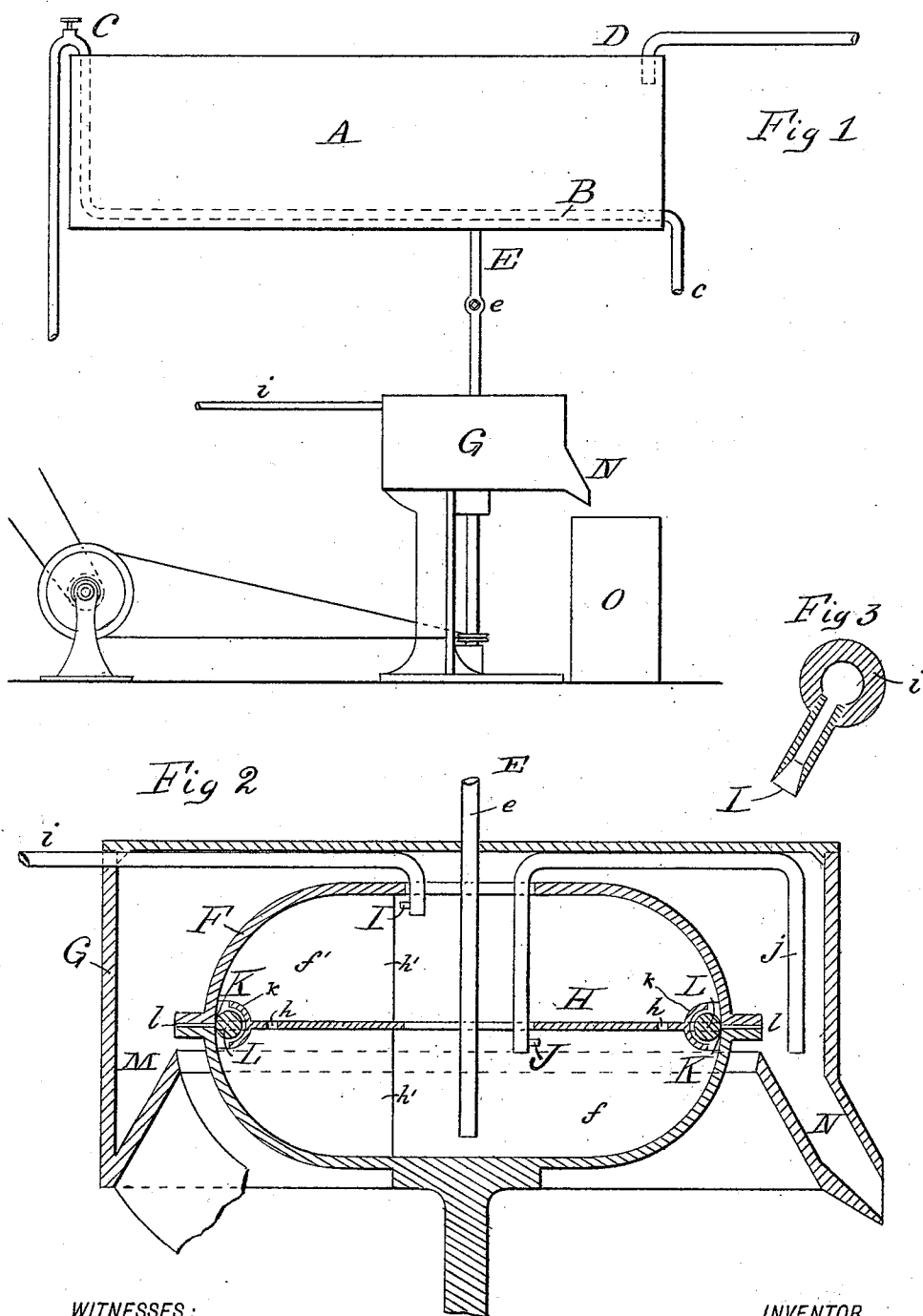


(No Model.)

J. NAYLOR, Jr.
SIRUP PURIFIER.

No. 529,662.

Patented Nov. 20, 1894.



WITNESSES:
Chas. W. E. Brombehorst.
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UNITED STATES PATENT OFFICE.

JAMES NAYLOR, JR., OF BOSTON, MASSACHUSETTS, ASSIGNOR OF THREE-
FOURTHS TO GEORGE THOMAS MCLAUTHLIN, OF SAME PLACE.

SIRUP-PURIFIER.

SPECIFICATION forming part of Letters Patent No. 529,662, dated November 20, 1894.

Application filed November 14, 1891. Serial No. 411,887. (No model.)

To all whom it may concern:

Be it known that I, JAMES NAYLOR, Jr., a citizen of the United States, and a resident of Boston, in the county of Suffolk and State of Massachusetts, have invented new and useful Improvements in Sirup-Purifiers, of which the following, taken in connection with the accompanying drawings, is a specification.

The object of my improvements is to produce sirup at a reduced cost and which will have an increased marketable value; and it consists in subjecting heated crude sirup to the action of centrifugal force in such a manner and by such means as will be hereinafter described; together with other essential details which will be specifically set forth in the claims. Sirups have been clarified by passing through animal charcoal or other materials, and by the introduction of foreign substances into its bulk to cause precipitation.

By the use of my improvements the former may be entirely dispensed with and the latter reduced to such only as is required for chemical action.

In the drawings:—Figure 1 shows a side elevation of the whole apparatus; Fig. 2, a sectional elevation of the bowl and appurtenances; and Fig. 3 a full sized, horizontal section of the skimmers.

A is a heating tank, having a steam coil B within it, and passing through it to the outlet for condensed steam at c. The steam supply pipe is provided with a regulating valve C. The supply of unclarified sirup flows into the tank through the pipe D. Another pipe E leads from the tank to the machine and is also provided with a regulating valve e.

The machine has the usual imperforate bowl F, surrounded by a cover or case G, and may be driven by any devised means but preferably by what is shown. The normal periphery speed of the bowl should be four miles per minute.

Referring to Fig. 2 the bowl F is divided into a lower compartment *f* and an upper compartment *f'* by the horizontal partition H having the communicating openings *h h* through it, and the blades *h' h'* secured to it, and extending from the periphery to within one eighth of an inch of the skimmers I and J as the blades pass by in rotation. These skim-

mers are located respectively at the uppermost part of each compartment and communicate with their respective discharge pipes *i* and *j*.

K K are automatic check valves.

L L are spheres of a specific gravity about 1.7 or between that of the sirup and the heavy impurities which close to and open from the outlets *ll* in the periphery of the bowl, being held in position by the projections *k—k* which form pockets in which said spheres have only a limited scope of movement. The pipe *j* leading from the lower compartment of the bowl and the outlets *ll* in the periphery discharge into the annular trough M inside the case of the machine, a common outlet spout N being provided to carry these discharges off to the receptacle O.

At Fig. 3 is shown a full sized horizontal section of the skimmers I and J. The outer diameter of the skimmer is alike along its length, with a hole through it of different diameter as shown, the bevel to form the skimming edge being on the inside thereof.

The operation is as follows:—Crude sirup is run through the pipe D to the tank A. Steam is admitted through the valve C to the coil B which heats the sirup to a proper temperature. The flow of heated sirup is regulated to the machine by the stop cock *e* in the pipe E, through which it passes to enter the lower compartment *f* of the bowl, where the impurities are at once separated from the sirup; the heavy mineral and organic matter being thrown to the periphery by centrifugal force, and the light albuminoids and gum to the surface. The partially clarified sirup in its circulation through the bowl passes through the holes *h h* and into the upper compartment *f'*, when a further clarification goes on until the sirup enters the skimmer I and is carried through the pipe *i* to proper receptacles. Just before the sirup enters the skimmer it is thoroughly clarified but not in all cases pure. The high speed of the bowl and the peculiar opening in the skimmer, (see Fig. 3) are such that much air is thoroughly commingled with it, which has the good effect of removing all taint or flavor foreign to the nature of the sirup. The skimmer J is set farther away from the surface of the sirup than the skim-

mer I so as to insure no sirup going into it. The light impurities accumulate on the surface by the well known natural law of dense liquids supporting lighter ones at a higher elevation; and thus reach the skimmer and are continuously discharged through the pipe *j* into the annular trough M. The heavy impurities collect at the periphery, and on accumulation the valves K K automatically open allowing them to escape; when the valves again close. These results are obtained through the difference in the specific gravity of the valve spheres, of the heavy impurities and of the sirup. Both refuse discharges go into the annular trough M and leave the machine at the spout N and are thus conducted to the receptacle O.

It is well known in cream and milk separation that the new milk is best separated at a certain temperature and is always raised to such by any simple means. Crude sirup is necessarily given a much higher temperature to facilitate its purification in passing through this machine. Heating the crude sirup is not broadly claimed; neither are the means by which it is heated, but it must be understood that it is by the heated condition of the crude sirup that the purification is effected by the machine.

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

1. In a centrifugal sirup purifier the combination with a supported arbor and bowl, said bowl divided into equal compartments by the horizontal partition H; of means for maintaining an inflow of crude sirup thereto, a discharge for refined sirup, a discharge for the light impurities and a discharge directly outward from and through the openings in the periphery for the heavy impurities as herein shown and described.

2. In a centrifugal sirup purifier the combination with the supported arbor and bowl, said bowl provided with automatic means of discharge and the partition H at its greatest internal diameter; of the skimmers I and J placed above and below said partition and means whereby an inflow is maintained to said bowl as herein set forth.

3. In a centrifugal sirup purifier the combination with the supported arbor and bowl,

said bowl having an upper and lower compartment and provided with valves at its periphery to serve both compartments; of means for inflow of the crude sirup and discharge of the refined as herein set forth.

4. The combination with the mounted bowl having equal upper and lower compartments with communicating openings; of the inlet pipe E, skimmers J and I, pipes *j* and *i* and the automatic check valves K K as shown and described.

5. In a sirup purifier the combination with a centrifugal separating mechanism provided with automatic discharge valves K K for heavy impurities, a discharge for light impurities consisting of the skimmer J set below the partition H and the pipe *j* leading therefrom; of means for conducting the discharged impurities consisting of the annular trough M and outlet spout N as herein set forth.

6. In a sirup purifier the combination with a mounted arbor and bowl provided with a horizontal partition H having projections *k k* extending therefrom; of the automatic discharge valves K K substantially as shown and described.

7. The combination with a mounted bowl; of the skimmer I having its external diameter uniform along its length and the bevel to form the skimming edge upon the inside thereof, and its supporting and conducting pipe *i* secured to the case G as constituting the means of discharge for refined sirup as herein shown and described.

8. In a centrifugal sirup purifier the combination with a supported arbor and bowl, said bowl provided with the partition H and the valves K K both in the same horizontal plane, said partition dividing said bowl into two equal separating compartments; of means for inflow thereto and separate discharges therefrom of the light and heavy impurities and the refined sirup as herein set forth.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 11th day of November, A. D. 1891.

JAMES NAYLOR, JR.

Witnesses:

M. W. E. BRUNKHORST,

M. B. McLAUTHLIN.