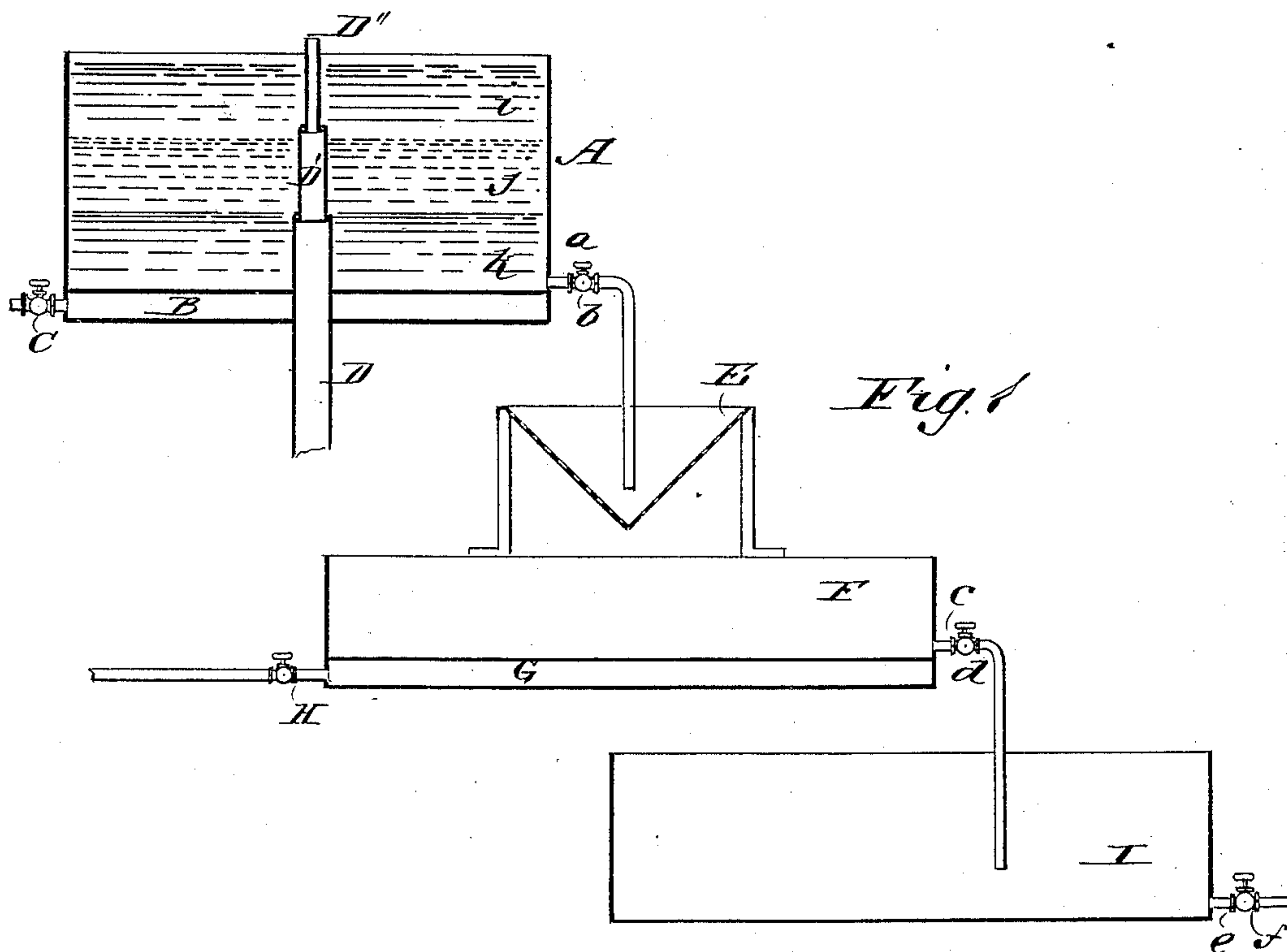


(No Model.)

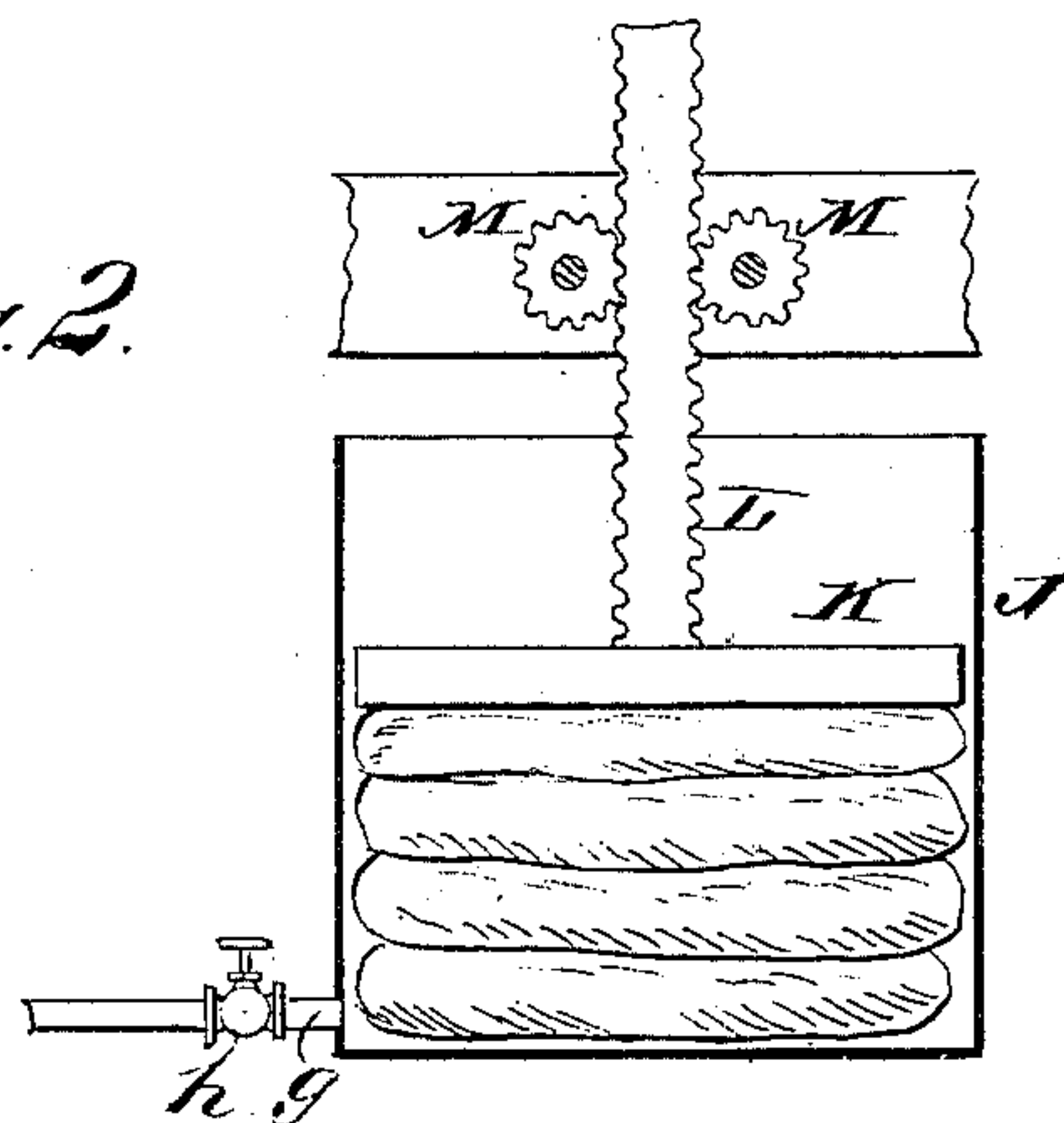
J. W. STAIRS & J. CRAIG.  
PROCESS OF AND APPARATUS FOR MANUFACTURING CONCENTRATED  
EXTRACT OF COD LIVERS.

No. 353,090.

Patented Nov. 23, 1886.



*Fig. 2.*



WITNESSES:

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# UNITED STATES PATENT OFFICE.

JAMES W. STAIRS AND JOHN CRAIG, OF HALIFAX, NOVA SCOTIA, CANADA.

PROCESS OF AND APPARATUS FOR MANUFACTURING CONCENTRATED EXTRACT OF COD-LIVERS.

SPECIFICATION forming part of Letters Patent No. 353,090, dated November 23, 1886.

Application filed February 13, 1886. Serial No. 191,803. (No model.)

*To all whom it may concern:*

Be it known that we, JAMES W. STAIRS and JOHN CRAIG, of Halifax, Nova Scotia, in the Dominion of Canada, have invented a new and Improved Process of and Apparatus for Manufacturing Concentrated Extract of Cod-Livers, of which the following is a specification, reference being had to the annexed drawings, forming a part thereof, in which—

10 Figure 1 is a side sectional elevation of the heating and separating vats. Fig. 2 is a side elevation, partly in section, of the press.

Similar letters of reference indicate corresponding parts in both figures of the drawings.

15 The object of our invention is to provide an improved process and apparatus by which the concentrated extract of cod-livers is obtained in a state in which it will keep without any special care being taken for its preservation.

20 The heating-vat A, in which the livers are cooked, is provided with a steam-jacketed bottom, B, receiving steam through the pipe C. In the center of the vat is inserted a tube, D, having at its upper end two telescopic lengths, D' D'', which slide into each other and into the tube D.

In the side of the vat, above the steam-jacketed bottom B, is inserted a pipe, a, provided with a valve, b, the pipe turning downward and discharging into a bag-filter, E, supported above the evaporating-pan F. The evaporating-pan F is provided with a steam-jacketed bottom, G, and with a steam-supply pipe, H, connected with the steam-space in the bottom of the pan. Above the steam-jacketed bottom G is inserted a pipe, c, which is provided with a valve, d. The end of the pipe c turns downward and discharges into a vat, I, placed below the evaporating-pan F.

40 In the side of the vat I, near the bottom thereof, is inserted a pipe, e, provided with a valve, f.

The press shown in Fig. 2 is of the ordinary description, consisting of a vat, J, a follower, K, fitted thereto, and a rack-bar, L, secured to the follower and engaged by the pinion M, by which it is forced downward. In the side of the vat J, near the bottom thereof, is inserted a pipe, g, provided with a valve, h.

50 The galls are removed from the cod-livers, and the livers are washed and placed in the vat A, when steam is admitted through the pipe C to the steam-jacket at the bottom of the

vat, and the mass is heated until it is reduced to a homogeneous pulp, when the steam is turned off and the contents of the vat are allowed to settle for one hour or so. This divides the contents of the vat into three parts—the upper stratum, i, consisting of oil, the intermediate stratum, j, being a mixture of oil, gurly, and water. The lower stratum, k, consists of a liquid extract of the livers.

The oil is run off from the vat A by pulling down the upper section, D'', of the tube D, until all the clear portion of the oil is removed, when the liquid k in the bottom of the vat A is drawn from the vat through the pipe a, being discharged from the pipe a into the bag-filter E, which retains the solid portions carried by the liquid, and allows the liquid to fall into the evaporating-pan F. In the evaporating-pan the liquid is boiled for one or two hours, and is then run off through the pipe c into the vat I and is allowed to cool, after which it is again put through the filtering-bags, and back into the evaporating-pan, where it is evaporated until it reaches a sirupy consistency, in which state it will keep for years.

The intermediate stratum, j, which consists of oil, gurly, and water, is run into the filtering-bags, and is afterward placed in the vat J of the press and put under pressure. The liquid coming from the press being allowed to settle, the oil is removed from the top of the liquid and placed with the oil removed from the vat A in the earlier state of the process, and the other liquid removed from the bags, along with the oil, is strained and evaporated in the evaporating-pan F, and is placed with the sirupy mass produced in the earlier stages of the process.

The concentrated extract of cod-livers prepared in the manner described contains valuable medicinal qualities, which are effectual in the relief of dyspepsia, consumption, bronchitis, and other lung affections, having all the properties of cod-liver oil, but in a more concentrated form, and without the fat or oil. It is soluble in water, and is readily assimilated.

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

1. In apparatus for preparing concentrated extract of cod-livers, the combination, with a vat, A, provided with a steam-jacketed bottom,



B, of the central telescopic tube for the discharge of the upper stratum of the contents of the vat, the discharge-pipe *a*, filter-bag E, the evaporating-pan F, provided with a steam-jacketed bottom, the discharge-pipe *c*, and the cooling-vat I, substantially as herein shown and described.

2. The process of preparing the concentrated extract of cod-livers, which consists in rendering the livers by heat, withdrawing the oil from the top of the mass rendered, discharging the liquid from the bottom of the mass rendered, filtering it, and concentrating it by heat, substantially as herein shown and described.

3. The process of preparing concentrated extract of cod-livers, which consists in heating the livers until they are reduced to a pulpy mass, withdrawing the oil from the watery and solid portions of the mass, afterward removing the aqueous extract of the livers and concentrating it by heat in an evaporating-pan, and

finally discharging it from the evaporating-pan into a cooling-vat, substantially as herein shown and described.

4. The process of preparing concentrated extract of cod-livers, which consists in heating the livers until they are reduced to a pulpy mass, withdrawing the oil from the watery and solid portions of the mass, afterward removing the aqueous extract of the livers and concentrating it by heat in an evaporating-pan, and finally discharging it from the evaporating-pan into a cooling-vat, returning the contents to the filter-bag and evaporating-pan and reconcentrating the liquid, substantially as herein shown and described.

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