

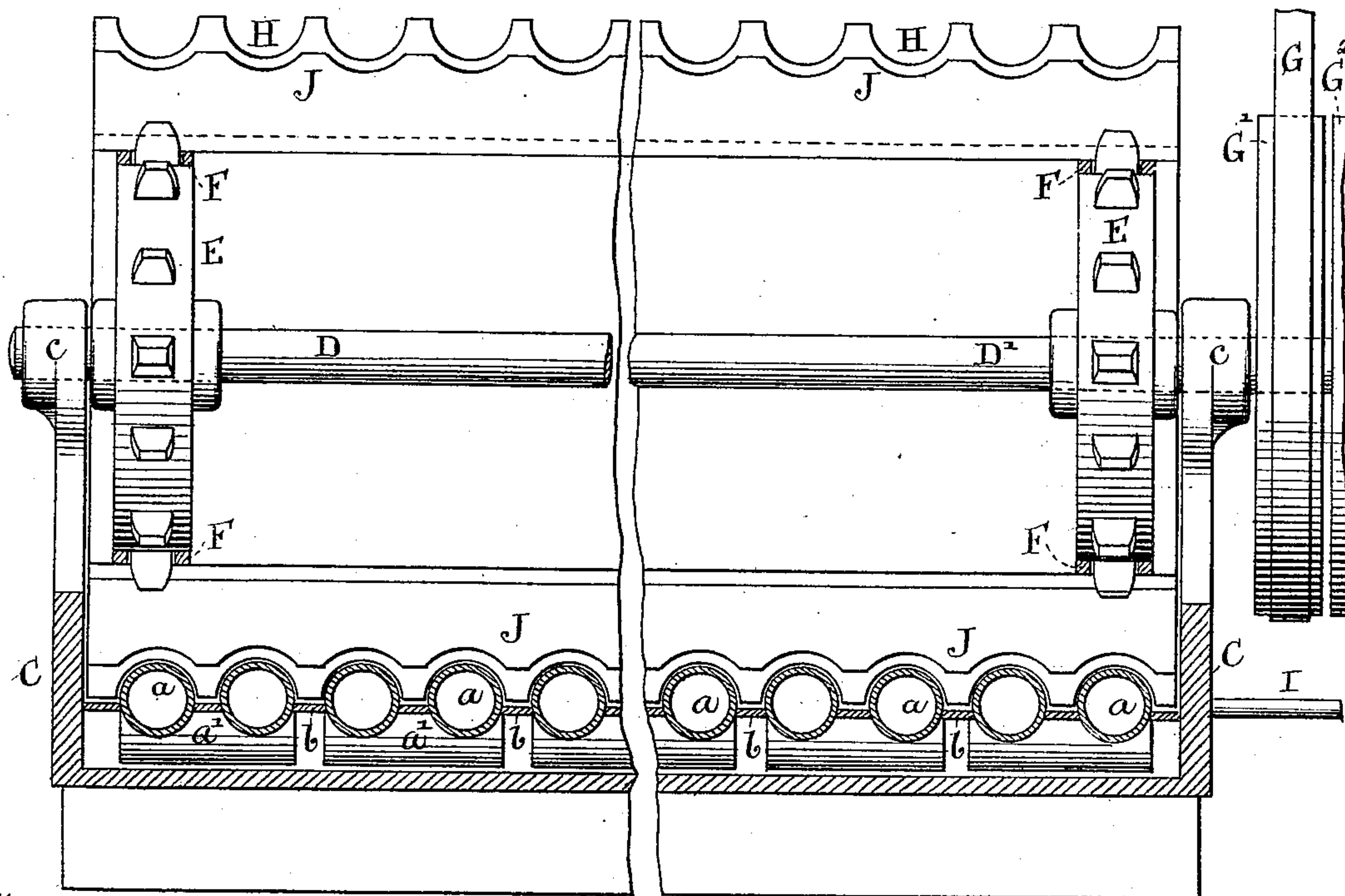
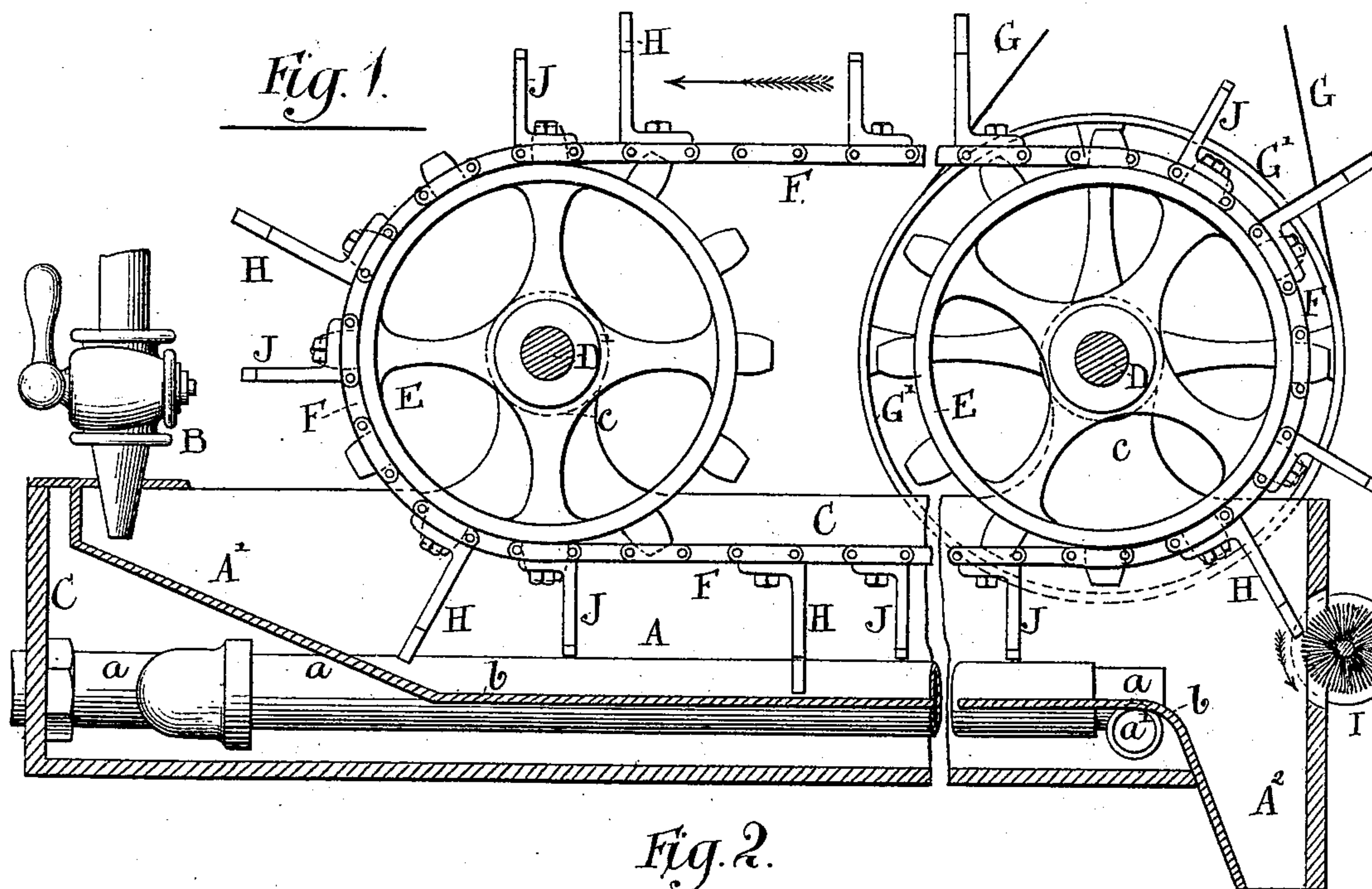
(No Model.)

W. BELL.

PROCESS OF AND APPARATUS FOR COOLING OR CONGEALING LIQUIDS
AND SEPARATING CRYSTALS THEREFROM.

No. 251,512.

Patented Dec. 27, 1881.



Witnesses:

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UNITED STATES PATENT OFFICE.

WILLIAM BELL, OF NEW YORK, N. Y.

PROCESS OF AND APPARATUS FOR COOLING OR CONGEALING LIQUIDS AND SEPARATING CRYSTALS THEREFROM.

SPECIFICATION forming part of Letters Patent No. 251,512, dated December 27, 1881.

Application filed September 27, 1881. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM BELL, of the city and county of New York, in the State of New York, have invented a new and Improved

5 Process of and Apparatus for Cooling or Congealing Liquids and Separating Crystals therefrom, of which the following is a specification.

My invention more particularly relates to the production of paraffine-wax, or the separation thereof from paraffine-oil; but it may likewise be used with advantage for separating from any substance the crystals which form thereon in the process of congelation.

10 The invention consists in a novel process of separating the wax from paraffine, or the crystals from other substances of a crystalline nature, said process consisting in passing the paraffine or other liquid over a hollow table or bed, through which is circulated a cooling

20 agent by means of scrapers or blades, which keep the substance evenly distributed and carry away the crystals as fast as formed. By varying the temperature of the table or bed different grades of wax may be produced.

25 The invention also consists in a machine of novel construction for carrying out my improved process, as fully hereinafter described.

In the accompanying drawings, Figure 1 represents a vertical longitudinal section through 30 the machine, the central portion thereof being broken away to reduce the length of the machine in the drawings; and Fig. 2 represents a vertical transverse section thereof, the central part also being broken away to reduce width.

35 Similar letters of reference designate corresponding parts in both the figures.

A designates a hollow table or bed, which is here shown as composed of a series of parallel pipes, *a*, and pieces *b*, fitted between the 40 pipes to preclude the escape of liquid between them. One of the pipes *a* has a supply-pipe connected with it, and another is connected with an escape-pipe, while all the others are connected at their ends, so as to form a circuitous passage, through which water or any other cooling or refrigerating agent is circulated. At one end of said table or bed is represented an inclined portion, *A'*, and at the 45 opposite end is a chute, *A²*. At the end of the table at which is the chute *A²* the several pipes,

a, are united by means of drop-connections *a'*, instead of ordinary return-bends, so that the filling-pieces *b* may pass over them and be continued straight ahead to the chute *A²*.

The whole of the table or bed *A* might be 55 slightly inclined, if desirable, to produce a flow of liquid over it, and it may be made in any suitable manner, instead of by pipes, and may have a flat or plane surface, instead of an undulating surface, as here represented. 60

At the incline *A'* is arranged a delivery cock or valve, *B*, the outlet-nozzle of which is narrow in the direction of the length of the table or bed, as seen in Fig. 1, but is preferably broad enough to extend nearly the whole width 65 of the table or bed, in order that the paraffine or other liquid may be delivered in a thin sheet or stream all along the width of the table or bed.

C designates a chamber or box in which the 70 table or bed *A* is arranged, and which projects above said table or bed on all sides.

D D' designate shafts, which are adapted to rotate in suitable bearings, *c*, projecting above the sides of the box or chamber *C*, as seen in 75 Fig. 2; and *E* designates chain or sprocket wheels fixed upon said shafts, one near each end of each shaft.

F designates chains which gear with the wheels *E*, and which may be open-link chains 80 of any suitable construction, the manner of making such chains being well understood. The chains *F* serve to gear the two shafts *D D'* together, so that they will turn in unison, and by their turning the chains are moved along at 85 a uniform speed in the direction indicated by the arrow, Fig. 1.

Motion may be imparted to the shafts *D D'* by means of a belt, *G*, passing over a driving-pulley, *G'*, on the shaft *D*, as shown in dotted 90 outline in Fig. 1, and the shaft may also have upon it a loose pulley, *G²*, upon which the belt may be shifted to stop the machine.

If desired, an endless belt or apron might be employed in lieu of the chains *F*, and in such 95 case drums should be substituted for the chain or sprocket wheels *E*.

Upon the chains *F* are secured scrapers or scraping-blades *H*, which, as here shown, consist simply of angle or L-shaped pieces of 100

metal bolted upon the chains, and these scrapers or blades are made of a length about equal to the width of the table or bed A, so that they will pass snugly between the sides of the box or chamber C. The outer edges of the scrapers or blades H conform closely to the contour of the table or bed A in a transverse plane and travel in close proximity thereto. If the table or bed had a plane surface, the edges of the scrapers or blades would be straight; but as here represented their outer edges have concave recesses which approximately fit the exterior of the pipes *a* and intermediate tongues or projections which extend down between the pipes and to the pieces *b* between the pipes.

The paraffine or other liquid admitted by the cock B flows along the table or bed A, and if a current of cold water or other refrigerating or cooling agent be circulated through the bed the liquid will be chilled and congeal, and the crystals as they form in the process of congelation will be taken up and carried along by the scrapers, and finally will be removed or brushed off the faces of the scrapers by a metallic or other brush, I, arranged over the chute A², and will fall into the chute, from whence they may be delivered into bags or other suitable receptacles.

The brush I may be rotated from the shaft D by a belt, or in any other suitable way.

It will be observed that the drop-connections *a'* between the pipes *a* are advantageous, because they permit the projections on the edges of the blades H to pass between the pipes *a* clear to the end thereof, which they could not do if ordinary return-bends were used to connect the pipes.

In order to prevent the paraffine or other substance under treatment from banking up against the scrapers or blades H, I attach other blades, J, to the chains F, in advance of the blades H, which do not project so far as the blades H, and hence leave a thin film or sheet of liquid or substance in advance of the scrapers or blades H. The blades J are arranged in front or in advance of the blades H a distance equal to about one-third the whole distance between the blades H, and I term them "levelers," because they level off the liquid or substance and leave it uniformly spread out in front of the blades H.

By my invention I enable liquid paraffine to be cooled and congealed and its crystals separated in a very desirable manner, and by regulating the temperature of the table or bed the different grades of wax may be separated and collected separately. If all the wax is to be separated, the table or bed should be very cold; but if only the higher grades of wax are to be separated the temperature of the table or bed should be correspondingly raised.

My invention may be advantageously em-

ployed in separating the solid matters from any oleaginous substances, as in the production of tallow and lard-oil.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The process of congealing paraffine or other liquid and separating the crystals or solid matters therefrom, consisting in passing the paraffine or other liquid over a hollow table or bed through which circulates a cooling agent, by means of scrapers or blades which keep the liquid evenly distributed and remove the crystals or solid matters as they form, substantially as specified.

2. In a machine for separating the crystals from paraffine or other liquid, the combination of a hollow bed or table through which a cooling agent may be circulated, blades or scrapers, and mechanism for moving said blades or scrapers along and in close proximity to said hollow table or bed, substantially as specified.

3. In a machine for separating crystals from paraffine or other liquid, the combination of a hollow table or bed through which a cooling agent may be circulated, an endless apron or chains and drums or wheels therefor, and scrapers attached to said apron or chains and passing over and in close proximity to said table or bed, substantially as specified.

4. In a machine for separating crystals from paraffine or other liquid, the combination of a hollow bed or table through which a cooling agent may be circulated, an endless apron or chains and drums or wheels therefor, scrapers attached to said apron or chains and passing over and in close proximity to said bed or table, and levelers or leveling-blades attached to said apron or chains between said scrapers and having a less projection, substantially as specified.

5. In a machine for separating crystals from paraffine or other liquid, the combination of a hollow table or bed through which a cooling agent may be passed, an endless apron or chains and drums or wheels therefor, scrapers attached to said apron or chains and passing over and in close proximity to said table or bed, and a brush with which said scrapers come in contact and by which the crystals are removed from them, substantially as specified.

6. The combination of the table or bed A, which comprises circulating-pipes *a*, for the passage of a cooling agent, having drop-connections *a'* at their ends, and pieces *b* fitted between the pipes, the chute A² at the end thereof, the shafts D D', the chain-wheels E, the chains F, the scrapers H, and levelers J, attached to said chains, and the rotary brush I, substantially as specified.

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Witnesses:

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