

No. 678,893.

Patented July 23, 1901.

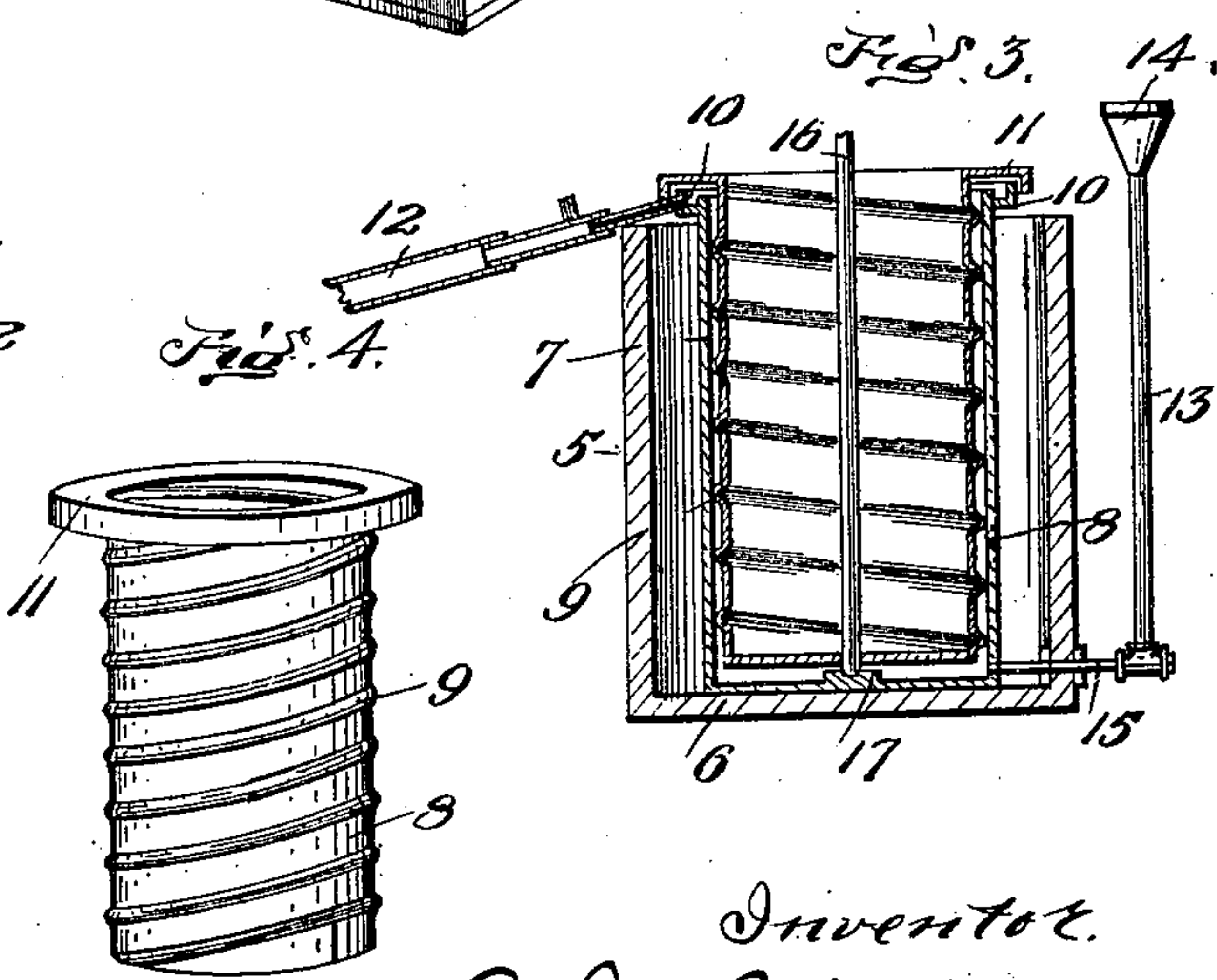
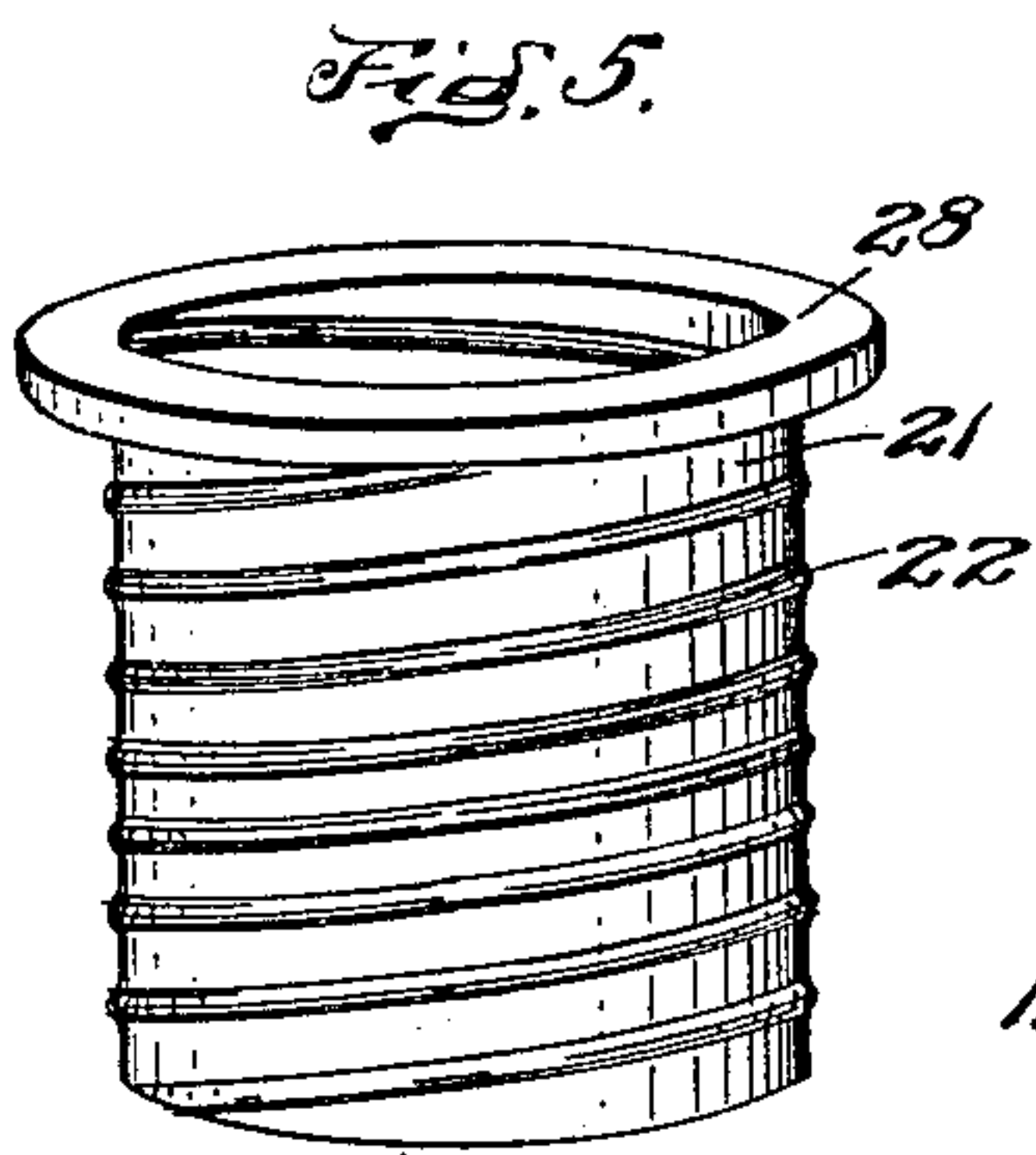
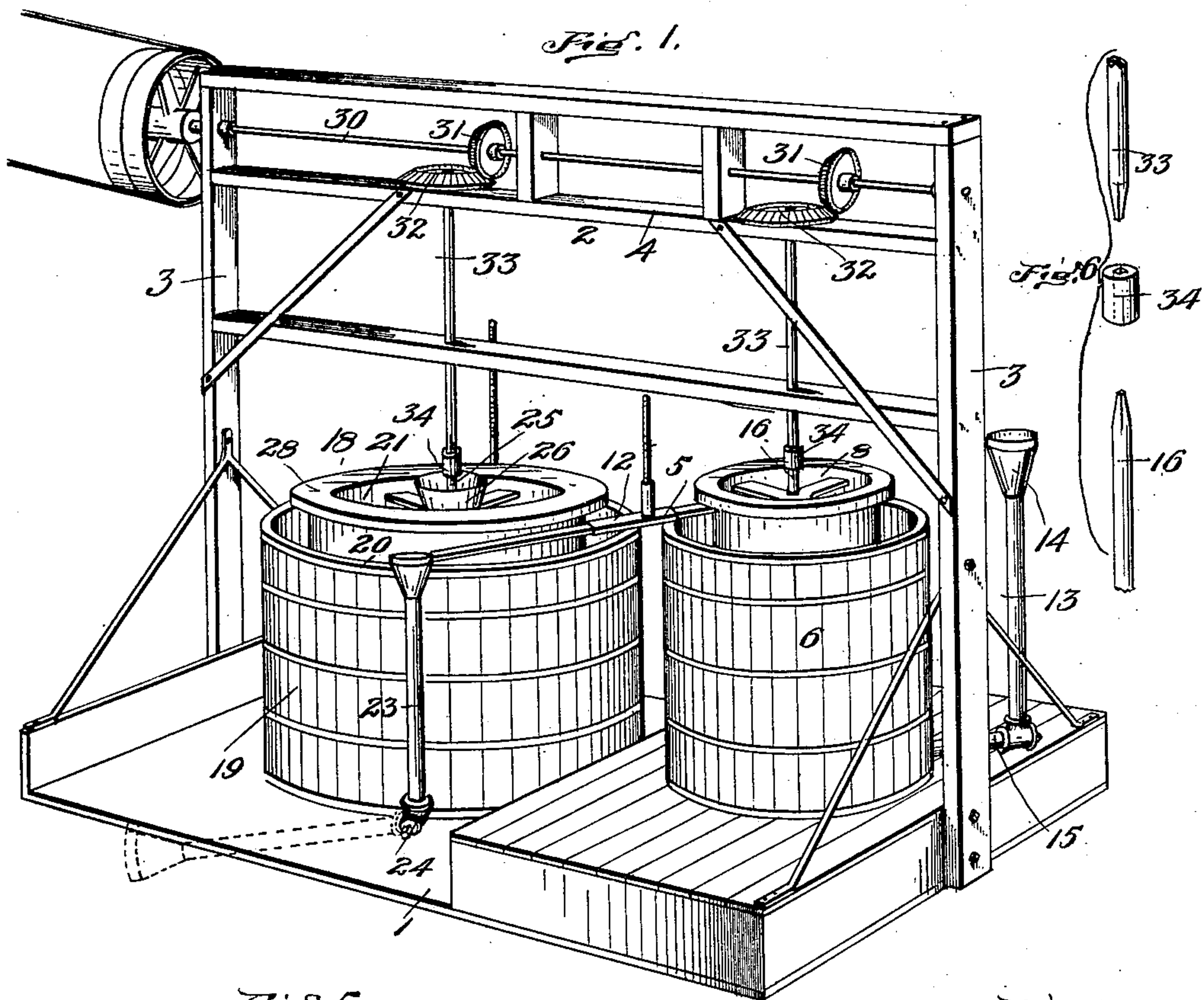
J. C. MILLER.

APPARATUS FOR STERILIZING AND COOLING LIQUIDS.

(Application filed Dec. 7, 1899.)

(No Model.)

2 Sheets—Sheet 1.



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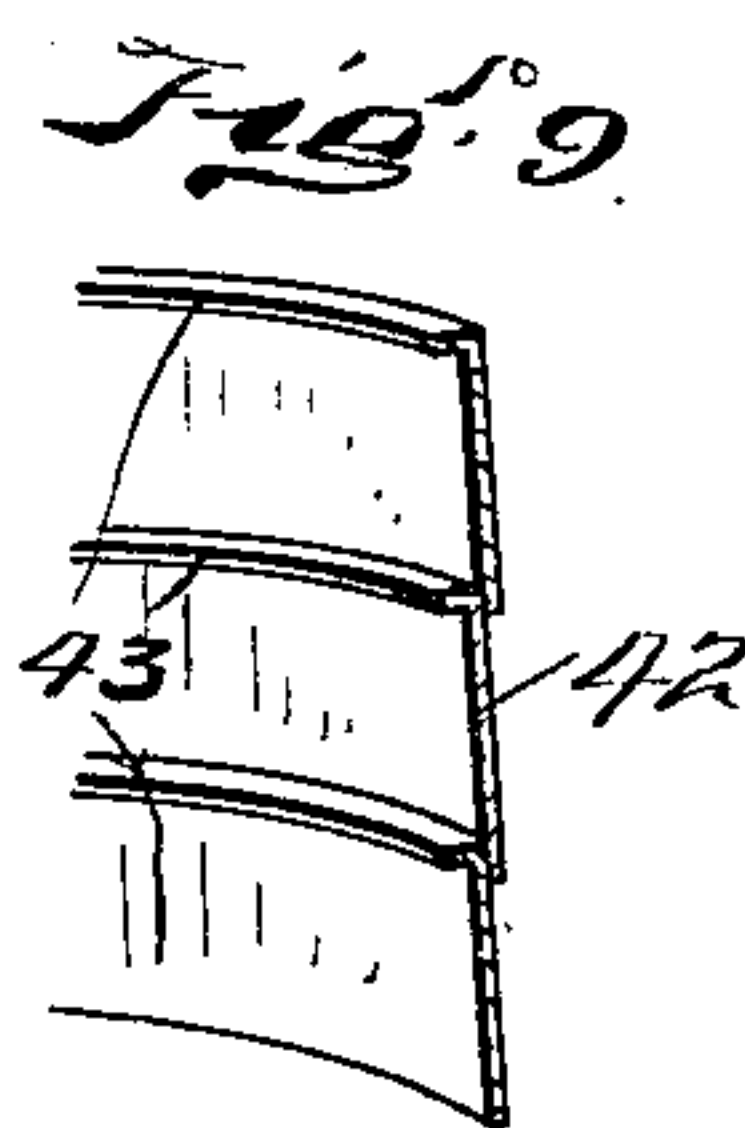
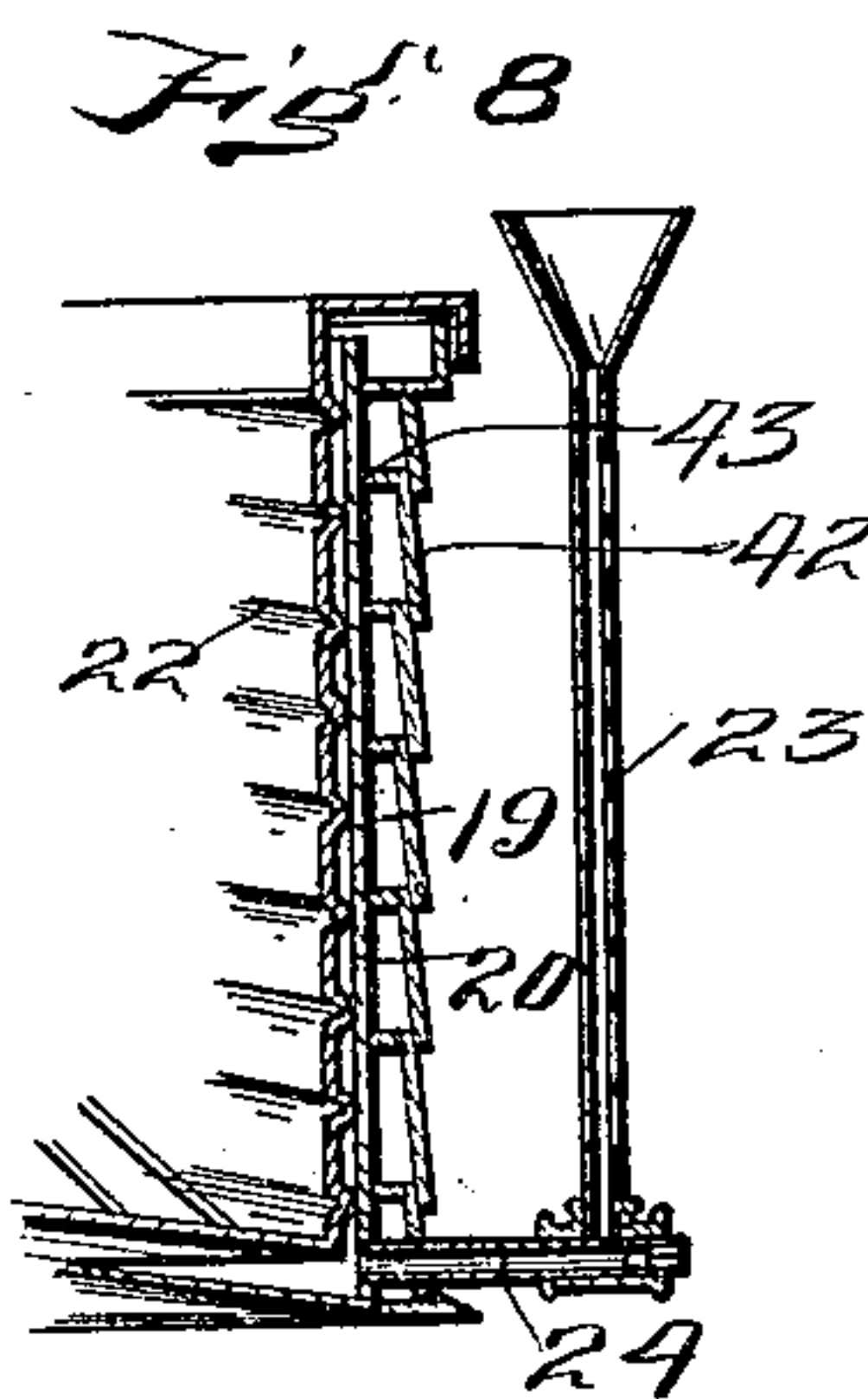
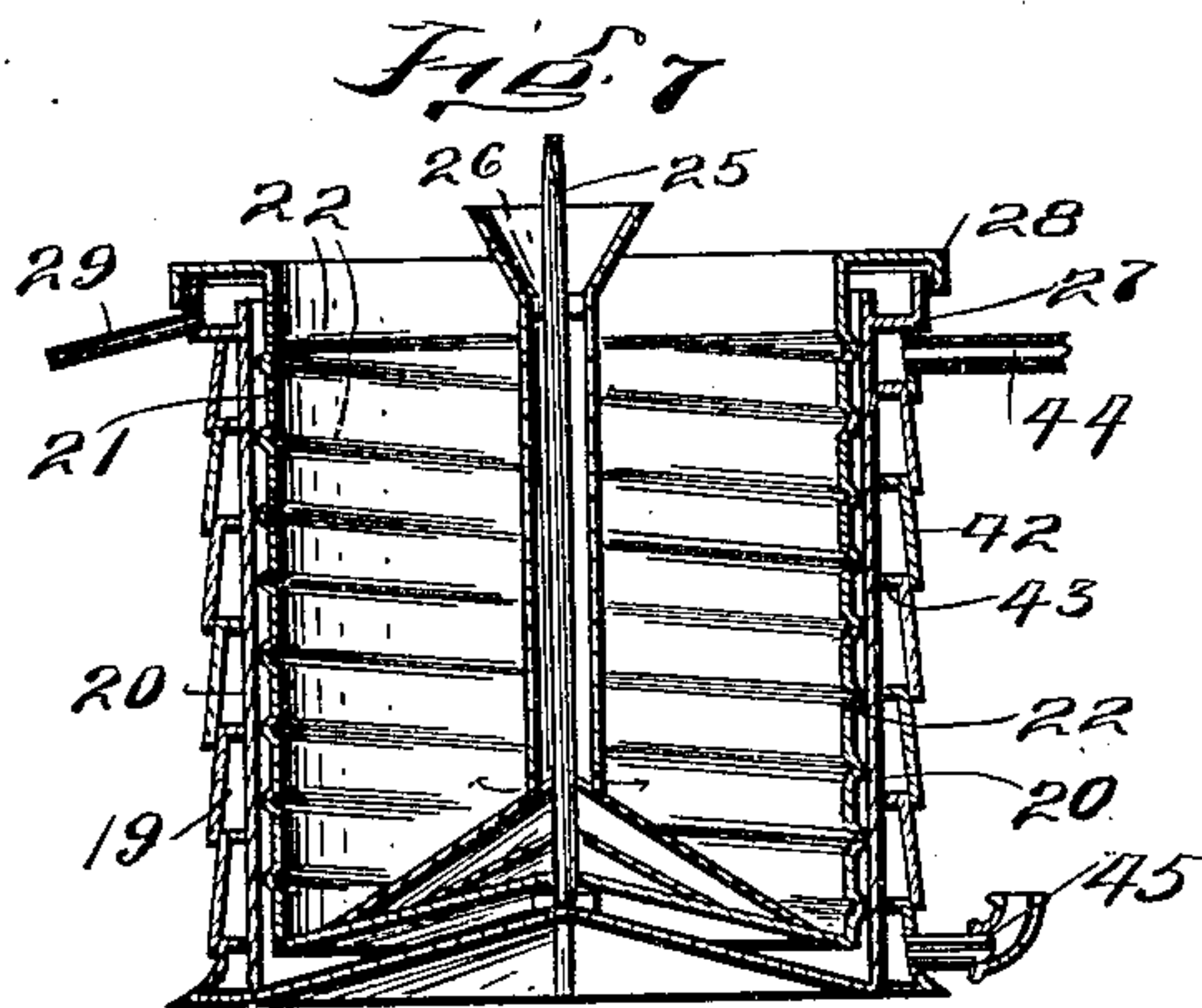
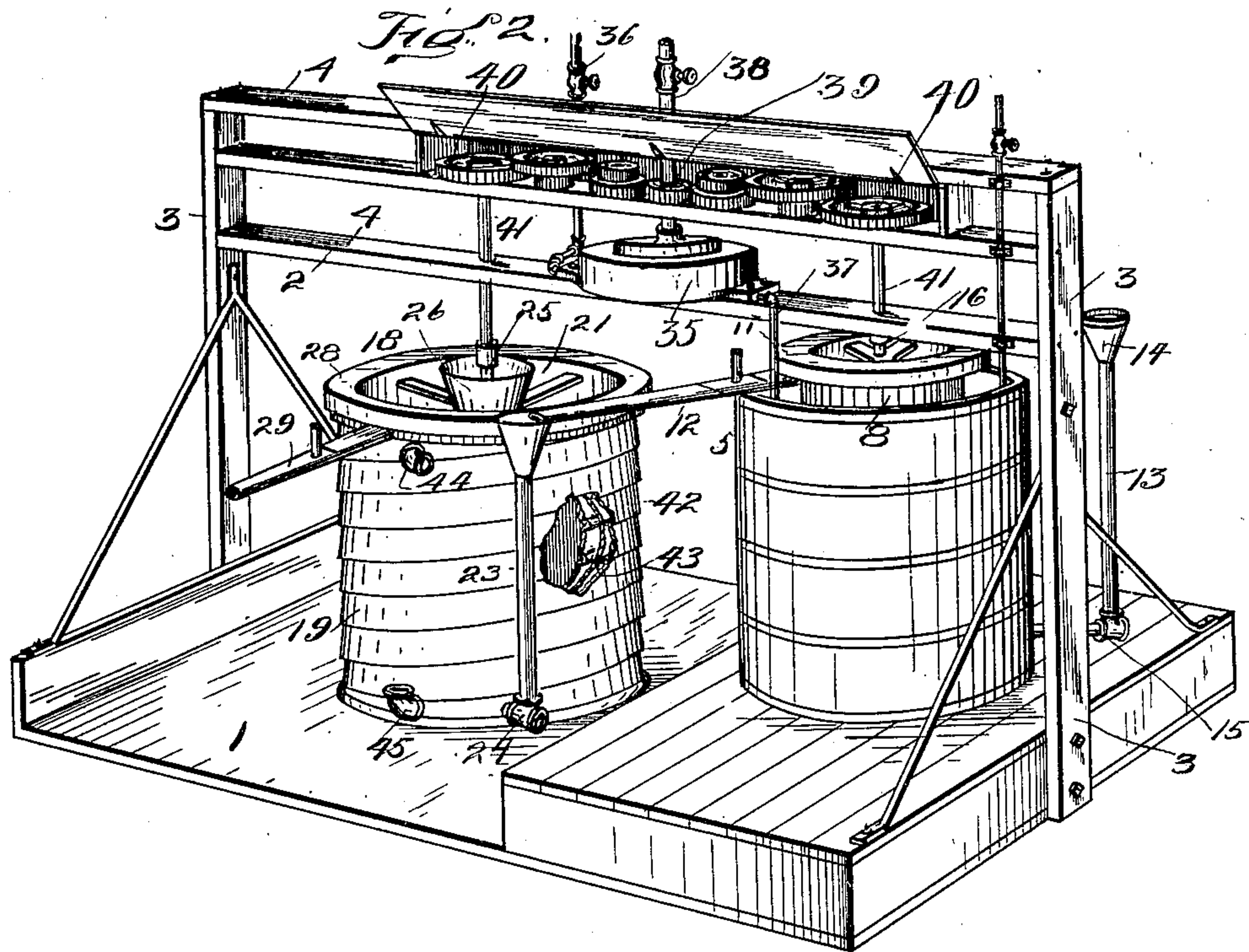
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(No Model.)

2 Sheets—Sheet 2.



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# UNITED STATES PATENT OFFICE.

JOHN C. MILLER, OF CANTON, OHIO, ASSIGNOR TO JACOB H. MILLER, OF  
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## APPARATUS FOR STERILIZING AND COOLING LIQUIDS.

SPECIFICATION forming part of Letters Patent No. 678,893, dated July 23, 1901.

Application filed December 7, 1899. Serial No. 739,469. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN C. MILLER, a citizen of the United States, residing at Canton, in the county of Stark and State of Ohio, have  
5 invented new and useful Improvements in Apparatus for Sterilizing and Cooling Liquids, of which the following is a specification.

The invention relates to an apparatus for sterilizing and cooling liquids.

10 The object of the invention is to provide means whereby the liquid may be rendered pure by killing the germs and its temperature be gradually lowered to its normal condition, thereby entirely removing the cooked  
15 taste caused by the initial raising of the temperature.

With this object in view the invention consists in certain features of construction and combination of parts, which will be hereinafter  
20 fully described and claimed.

In the accompanying drawings, Figure 1 is a perspective view of the apparatus driven by one form of gearing. Fig. 2 is a similar view showing another form of driving-gear-  
25 ing and a differently-constructed cooling-tub, a portion of said tub being broken away to more clearly show its construction. Fig. 3 is a vertical sectional view through the vessels forming the sterilizing section of the apparatus. Fig. 4 is a detail perspective view  
30 of the inner sterilizing-chamber. Fig. 5 is a similar view of the inner cooling-cylinder. Fig. 6 is a detail view of the shaft-couplings. Fig. 7 is a longitudinal vertical sectional view through the vessels constituting the cooler and illustrating a different form of cooler.  
35 Fig. 8 is a similar view taken on a different line. Fig. 9 is a fragmentary perspective view of the strip of which the tub of the cooler is  
40 formed.

In the drawings the same reference characters indicate the same parts of the invention.

1 denotes the supporting-bed, and 2 the gear-frame, the latter consisting of the vertical standards 3, connected by cross-bars 4  
45 and suitably braced.

5 denotes the sterilizer, which consists of the tub 6, which incloses two cylinders 7 and 8, the latter being inclosed within the former  
50 and formed with a helical corrugation or rim 9, which throughout its entire length engages

the inner wall of the cylinder 7 and forms a feed-screw. The upper end of the cylinder 7 is provided with an annular trough 10, while the upper end of the cylinder 8 is provided  
55 with an overhanging annular shield or flange 11, which prevents the liquid fed upward by the corrugated rib 9 from being thrown out of the trough. 12 denotes a pipe or conveyer leading from said trough and communicating  
60 with the cooler hereinafter described.

13 denotes the supply-pipe, the upper end of which is provided with a funnel 14 and the lower end of which communicates with a transverse pipe 15, which communicates with  
65 the bottom of the cylinder 7 and is adapted to supply the liquid to said cylinder below the bottom of the cylinder 8.

16 denotes a shaft fixed in the bottom of the cylinder 8 and having its lower end stepped  
70 in the bearing 17, formed in the bottom of the cylinder 7. This shaft is adapted to be rotated in a manner hereinafter described and will impart a rotary movement to the cylinder 8 to feed the liquid in the bottom of  
75 the cylinder 7 upward into the trough 10. Steam or hot water is adapted to be injected into the cylinder 8 to raise the temperature of the liquid as it is being fed upward from the bottom of the cylinder 7 by the helical  
80 rib or feed-screw and thoroughly sterilize the same.

After the liquid has been thoroughly sterilized and all the obnoxious germs killed it is desirable to cool the same or reduce it to its  
85 normal temperature, by doing which it is found that the cooked taste so objectionable to sterilized liquids is entirely removed. To this end I provide a cooler 18, which consists of a tub 19 and cylinders 20 and 21. Within  
90 the tub 19 and within the cylinder 21 is adapted to be placed a cooling agent, such as ice or cold water. The inner cylinder 21 is provided with a helical corrugation or feed-screw 22, which acts against the interior wall  
95 of the cylinder 20 in the same manner as does the corresponding part of the sterilizer.

The conductor-pipe 12 extends from the trough of the sterilizer to a feed-pipe 23, which communicates with a pipe 24, which  
100 leads to the space between the cylinders 20 and 21, and conveys the liquid from the sterilizer



to said space. The cylinder 21 is provided with a shaft 25 for rotating it and with a funnel 26, the lower end of which opens into the bottom of the cylinder. Through this funnel  
 5 is adapted to be passed the cold water. The upper end of the cylinder 20 is provided with a trough 27, while the upper end of the cylinder 21 is provided with an overhanging flange or shield 28.

10 29 denotes a discharge-pipe leading from the trough 27 to a point where the liquid is bottled or stored.

As shown in Fig. 1, the means employed for rotating the inner cylinder of the cooler and  
 15 sterilizer comprise the horizontal drive-shaft 30, to which are fixed beveled drive-wheels 31. These drive-wheels mesh with similar gears 32, fixed to the upper ends of counter-shafts 33, journaled in the cross-pieces of the  
 20 gearing-frame and secured at their lower ends to the shafts 16 and 25 by coupling-sleeves 34. However, I contemplate as coming within the scope of my invention of providing the mechanism shown in Fig. 2 for rotating the  
 25 inner vessels of the sterilizer and the cooler. This mechanism consists of a hot-water or steam motor 35, supported upon one of the cross-pieces of the frame. This motor is provided with a valve-controlled inlet-pipe 36  
 30 and an outlet-pipe 37, the latter extending into the tub of the sterilizer and designed to discharge the hot water or exhaust-steam therein, which may be used as a heating agent. The fan or rotary piston of this motor is pro-  
 35 vided with a drive-shaft 38, to which is fixed a drive-gear 39, which forms one of a train of gearing that actuates the gears 40, fixed to the shafts 41 of the inner cylinders of the sterilizer and the cooler.

40 If desired, I may form the tub of the

cooler of a spiral strip 42, having a continuous flange 43 to form a spiral chamber. In this event cold water may be fed to the spiral space through either of the pipes 44 45 and be let out of the other pipe, thus maintaining  
 45 a continuous circulation of cold water.

From the foregoing description, taken in connection with the accompanying drawings, the construction, operation, and advantages of my improved apparatus for sterilizing and  
 50 cooling liquids will be readily apparent without requiring an extended explanation. It will be seen that the apparatus is simple of construction, that said construction permits  
 55 of its manufacture at small cost, and that it is exceedingly well adapted for the purposes for which it is designed, and it will of course be understood that various changes in the form, proportion, and the minor details of con-  
 60 struction may be resorted to without departing from the principle or sacrificing any of the advantages of this invention.

Having thus described the invention, what is claimed, and desired to be secured by Letters Patent, is—

65 In a device of the character described, the combination with the sterilizer, of a cooler consisting of a tub and an inner and an outer vessel located within said tub and communicating with the sterilizer, said tub consisting  
 70 of a spiral strip having a continuous flange to form a spiral or winding chamber adjacent to the outer cylinder which is inclosed therein.

In testimony whereof I have hereunto set my hand in the presence of two subscribing  
 75 witnesses.

JOHN C. MILLER.

Witnesses:

CHAS. R. MILLER,  
 CHAS. M. BALL.