

No. 836,951.

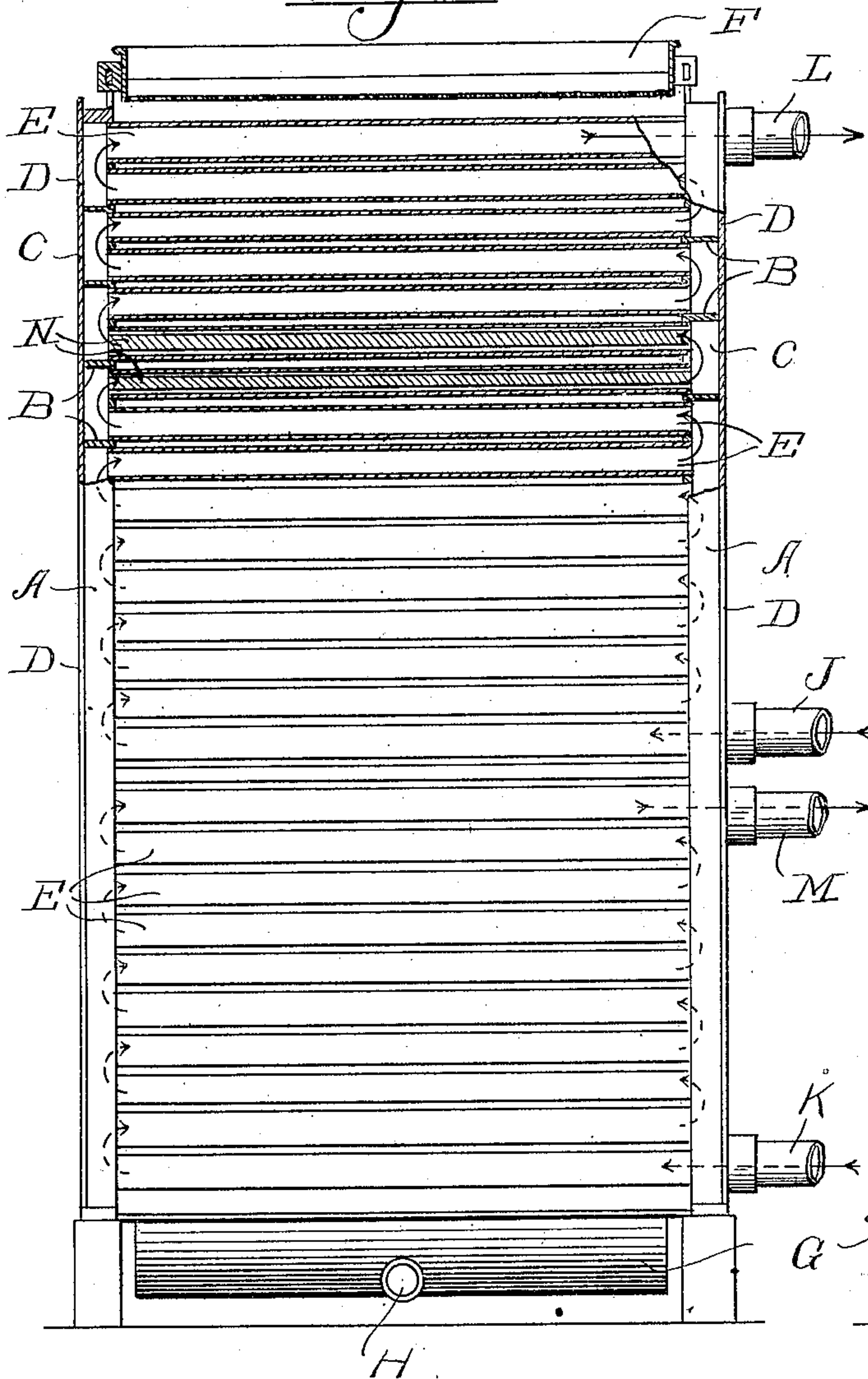
PATENTED NOV. 27, 1906.

J. WILLMANN.

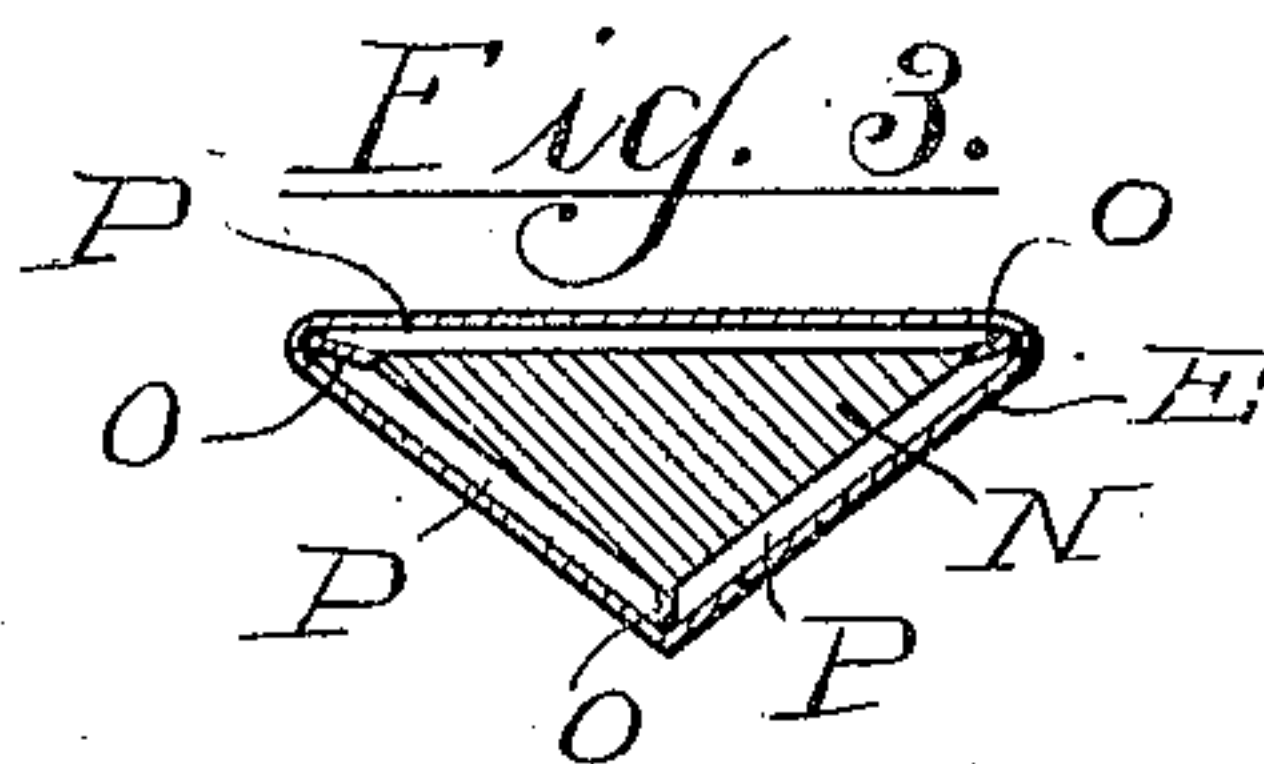
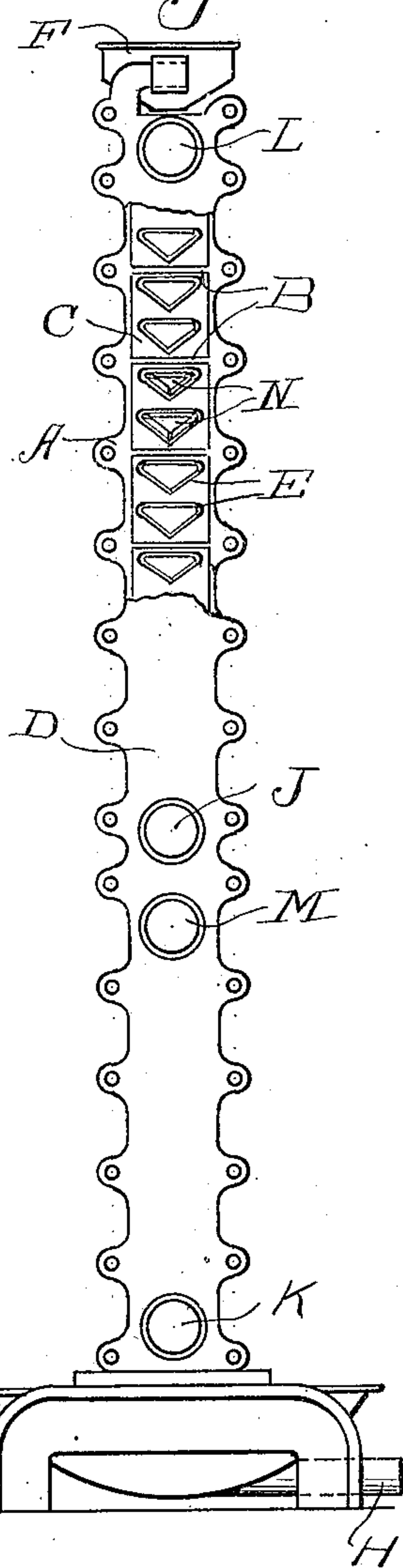
COOLER.

APPLICATION FILED MAY 23, 1904.

*Fig. 1.*



*Fig. 2.*



Witnesses:

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# UNITED STATES PATENT OFFICE.

JOSEPH WILLMANN; OF ROME, NEW YORK.

## COOLER.

No 836,951.

Specification of Letters Patent.

Patented Nov. 27, 1906.

Application filed May 23, 1904. Serial No. 209,186.

*To all whom it may concern:*

Be it known that I, JOSEPH WILLMANN, a citizen of Germany, residing at Rome, in the county of Oneida and State of New York, have invented certain new and useful Improvements in Coolers; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it ap-

10 pertains to make and use the same.

My invention relates to a novel construction in a cooler, the object being to provide a device of this character in which the liquid to be cooled passes over cooling-surfaces of conduits in which the cooling medium flows in the opposite direction; and it consists in the novel features of construction and combination of parts hereinafter fully described and claimed.

20 In the accompanying drawings, illustrating my invention, Figure 1 is a view, partly in side elevation and partly in central longitudinal section, of a cooler constructed in accordance with my invention. Fig. 2 is a view, partly in end elevation and partly in vertical transverse section, of the same. Fig. 3 is a detail transverse section, on an enlarged scale, of one of the conduits.

30 In cooling liquids by means of a heat-absorbing agent consisting of another liquid it is common practice to hold such liquids separate and cause the same to flow in opposite directions on opposite sides of a dividing-wall, so that the warmest part of the cooling medium is brought into position to absorb heat from the liquid to be cooled at the point of admission of same to the apparatus, and as the latter passes through the system or apparatus it is gradually brought into cooling relation with the colder part of the cooling medium, so that, on the one hand, the cooling liquid is gradually heated from its point of admission to its point of discharge, and the liquid to be cooled is likewise gradually cooled from its point of admission to its point of discharge from the apparatus. In order to carry out the process more rapidly, economically, and effectually, it is desirable that the cooling liquid should be finely divided, so that every portion of same is brought into contact with the cooling-surface, and it is likewise advisable that the liquid to be cooled should be similarly finely divided and flow very rapidly in the direction opposite to that of the flow of the cooling liquid, so that, on the one hand, the liquid to be

cooled will readily give off its heat, and, on the other hand, the cooling liquid will more readily and quickly absorb the same. My said apparatus is designed to efficiently carry out this cooling process and to this end comprises a frame comprising two hollow standards A, divided, by means of partition-walls B, into a plurality of compartments C, all of which are adapted to be closed by means of the cover D, bolted to each of said standards A in a suitable manner. In the inner wall of each of said standards A are a series of openings in which the ends of pipes or ducts E are adapted to be received, said openings being relatively so arranged that two of the same are in the bottom of each of said compartments C. The said ducts or pipes E extend horizontally, and the compartments C of the two standards are relatively so arranged that each of said pipes E enters an opening in the lower portion of a compartment of one standard, and the opening in the upper portion of an oppositely-disposed compartment in the other standard. Liquid admitted to one of said pipes E will thus be caused to flow in the opposite direction through the next adjacent pipe communicating therewith through one of said compartments C and will thereby pass zigzag through the entire series of said pipes or ducts. The said pipes or ducts are preferably substantially triangular in cross-section, the upper wall thereof being horizontally disposed and the lower walls inclined and forming a V. Disposed above the uppermost of said pipes E is a receptacle F, the bottom of which is also V-shaped and provided with a series of perforations from which liquid admitted to said receptacle flows upon the upper wall of the uppermost of said pipes E. The liquid thus flowing upon said pipe flows from the sides of same and follows the inclined bottom walls, from which it drops upon the middle of the upper wall of the next lower pipe, and so on until it reaches the last and lowest of such pipes, whence it flows into a receiving-pan G, disposed below said lowermost pipe, and from which it is exhausted through the pipe H. The liquid to be cooled is admitted through a pipe J and a pipe K. The liquid admitted through said pipe J passes zigzag through said pipes E in the upper portion of the frame and is discharged through the pipe L at the extreme upper end thereof, while liquid from the same or another source is admitted through said pipe K at the extreme



lower end of the frame and is exhausted through the pipe M, disposed immediately below said inlet-pipe J.

5 In order to more finely divide the liquid to be cooled and cause the same to flow more rapidly through the pipes E, the latter may be partially filled by the insertion of blocks N, conforming substantially in shape with said pipes and provided at their corners with  
10 projections O, extending into the corners of the pipes to center said blocks relatively thereto, thus leaving small spaces P between the walls of said pipes and said blocks. The insertion of said blocks is very advantageous,  
15 inasmuch as it brings all of the liquid to be cooled into play, whereas if said blocks are omitted the central body of the liquid to be cooled is not brought into intimate relation with the walls of the pipes and is therefore  
20 not capable of being affected to an appreciable extent.

My said cooler is very simple and efficient and is particularly well adapted for use in creameries and dairies.

25 I claim as my invention—

A cooler for liquids comprising two verti-

cal hollow standards open at the outer sides and divided by horizontal partitions into a plurality of chambers, a cover for each standard, said cover extending from end to end of  
30 the standard, a plurality of parallel horizontal pipes disposed one above the other and consecutively connected with each other at opposite ends, said pipes being substantially triangular in cross-section, a triangular plug  
35 of similar shape within each pipe, disposed centrally therein, and provided at its corners with projections extending into the corners of the pipe and a removable receptacle attached to said standards and having perfora-  
40 tions in its bottom for uniformly distributing a cooling liquid over the uppermost pipe, said cooling liquid being adapted to follow the inclined lower faces of said pipes, and pass from the apex upon the upper face of  
45 the next lower pipe.

In testimony whereof I affix my signature in presence of two witnesses.

JOSEPH WILLMANN.

Witnesses:

JOHN D. McMAHON,

PERRY M. ARMSTRONG.