

No. 674,257.

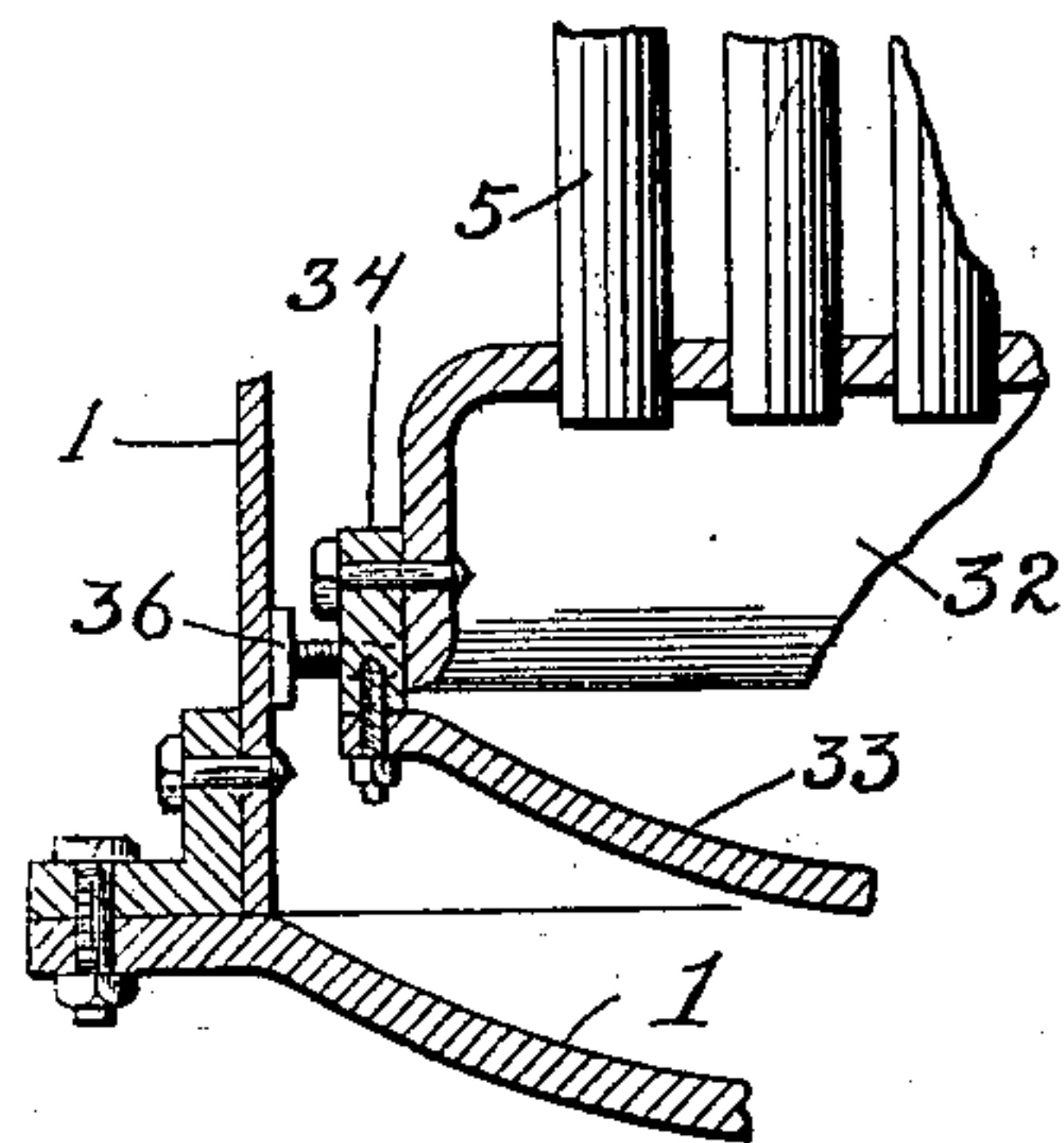
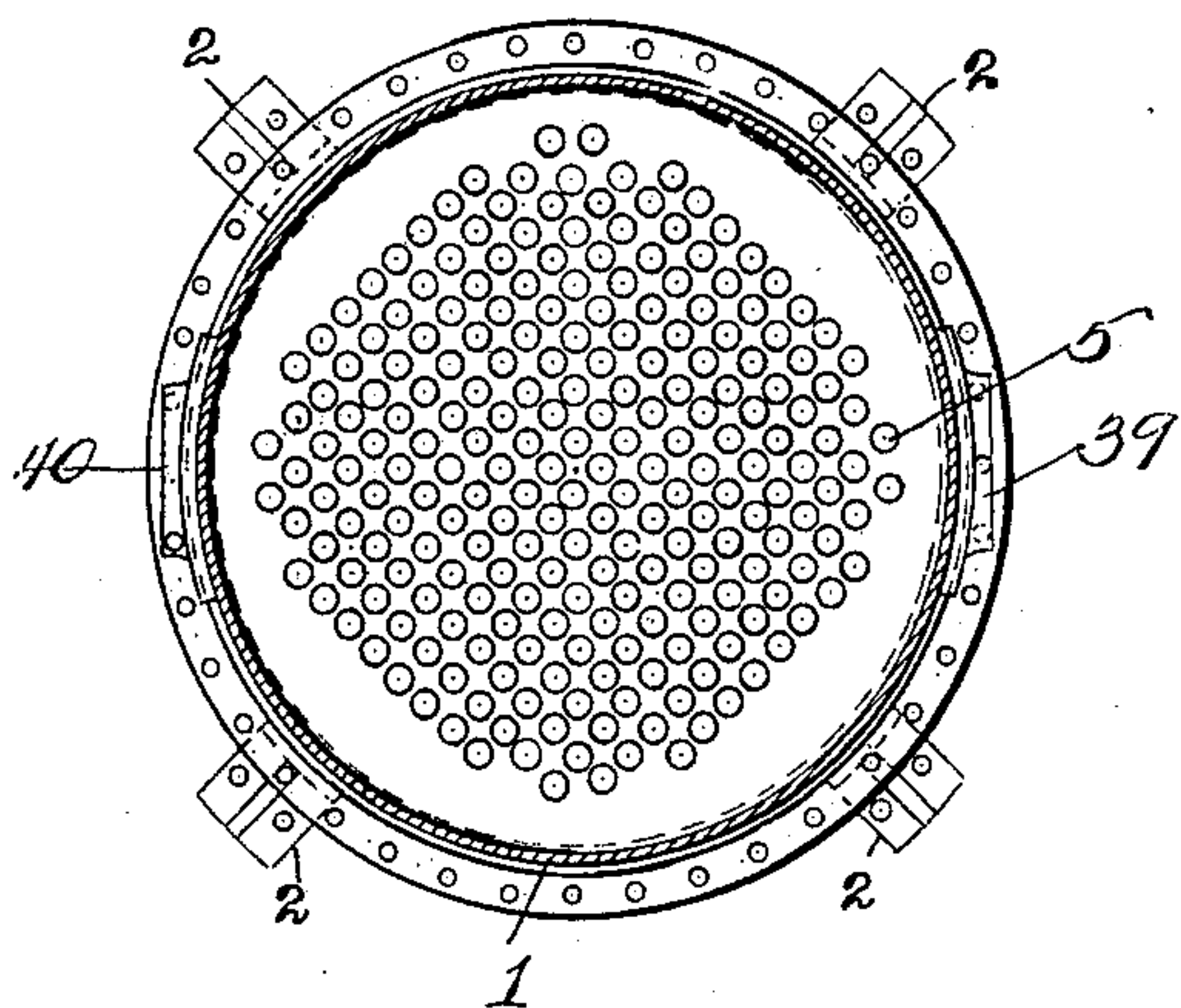
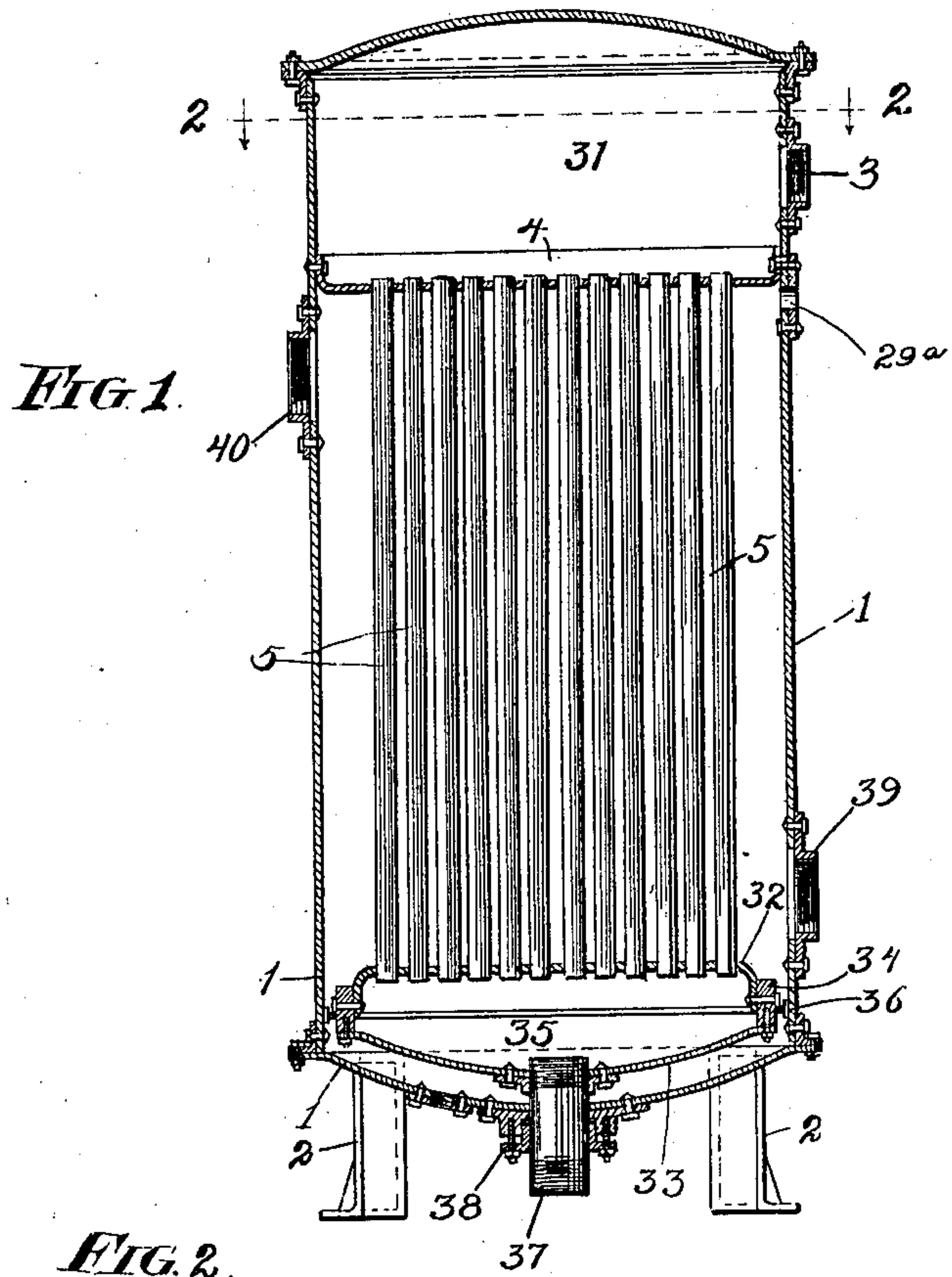
Patented May 14, 1901.

E. G. T. COLLES.

STEAM HEATER.

(Application filed Sept. 8, 1899.)

(No Model.)



Witnesses:  
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J. B. Keir

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# UNITED STATES PATENT OFFICE.

EDWARD G. T. COLLES, OF CHICAGO, ILLINOIS.

## STEAM-HEATER.

SPECIFICATION forming part of Letters Patent No. 674,257, dated May 14, 1901.

Application filed September 8, 1899. Serial No. 729,819. (No model.)

*To all whom it may concern:*

Be it known that I, EDWARD G. T. COLLES, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Steam-Heaters, of which the following is a full, clear, and exact specification.

My invention relates to steam-heaters for heating juice and other liquid without pressure; and it has for one object to provide a heater of simple, efficient, and inexpensive construction.

Another object of my invention is to provide a heater of improved construction in which the tubes are capable of moving under expansion and contraction without straining or loosening any of the joints.

A further object of the invention is to provide a heater so constructed that the flow of the liquid through the tubes will be rapid, thereby preventing to a large extent scale-forming substances from coating the heating-surfaces.

With these ends in view my invention consists in certain features of novelty in the construction, combination, and arrangement of parts by which the said objects and certain other objects hereinafter appearing are attained, all as fully described, with reference to the accompanying drawings, and more particularly pointed out in the claims.

In the said drawings, Figure 1 is a vertical sectional view of a heater constructed according to my improvements. Fig. 2 is a transverse or plan section taken on the line 2 2, Fig. 1. Fig. 3 is an enlarged detail section showing the parts at the lower end of Fig. 1.

In carrying out my invention I employ a shell 1, which is preferably cylindrical and stands upright, if desired, on suitable legs or supports 2. In the upper end of the shell 1, on one side, is formed an exit 3 for the juice or other liquid to be heated, and just below this exit 3 is secured a flue-sheet 4, into which the upper ends of a series of flues or tubes 5 are secured and from which they hang pendent. The upper end of the shell 1 is provided with a compartment or chamber 31, which is common to all of the tubes 5. The lower ends of the tubes 5 are secured in a flue-sheet 32, which is independent of the shell 1 and is suspended from the tubes 5. This sheet 32 is secured to a pendent head 33 by means of a

ring 34 and suitable screws and rivets or other devices, thus forming a lower chamber 35, from which all of the tubes 5 start upward. The lower chamber thus constituted is entirely independent of the shell 1 and is free to rise and fall as the tubes 5 contract or expand. The chamber 35 is centered in the shell 1 by guide-studs 36 in the form of set-screws secured in the outer periphery of the ring 34 and bearing accurately against the walls of the shell 1. The material enters the chamber 35 through a pipe connection 37, which is screwed or otherwise secured in the head 33 and passes through a stuffing-box 38, formed on the bottom of the shell, thus permitting the pipe 37 also to rise and fall without causing leakage. After rising through the tubes 5 the material enters the chamber 31, whence it exits via the side opening 3 therein. The steam or other heating medium is admitted at 39 and exhausted at 40, or vice versa.

29<sup>a</sup> is a vent for the escape of ammonia and other gases from the shell.

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

1. In an apparatus for the purpose described the combination of a shell having a compartment at its upper end, a series of pendent tubes communicating at one end with said compartment, a chamber independent of the shell secured to the lower end of said tubes and communicating therewith, guides thereon, a stuffing-box in the shell and a pipe passing through said stuffing-box and communicating with said chamber, substantially as set forth.

2. In an apparatus for the purpose described the combination of a shell having a compartment in one end, tubes communicating at one end with said compartment, a chamber or head independent of said shell and communicating with the other ends of said tubes, a stuffing-box in said shell, a pipe communicating with said head and extending through said stuffing-box, and the guide-studs 36 secured to said head between it and the walls of the shell, substantially as set forth.

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Witnesses:

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