

May 12, 1931.

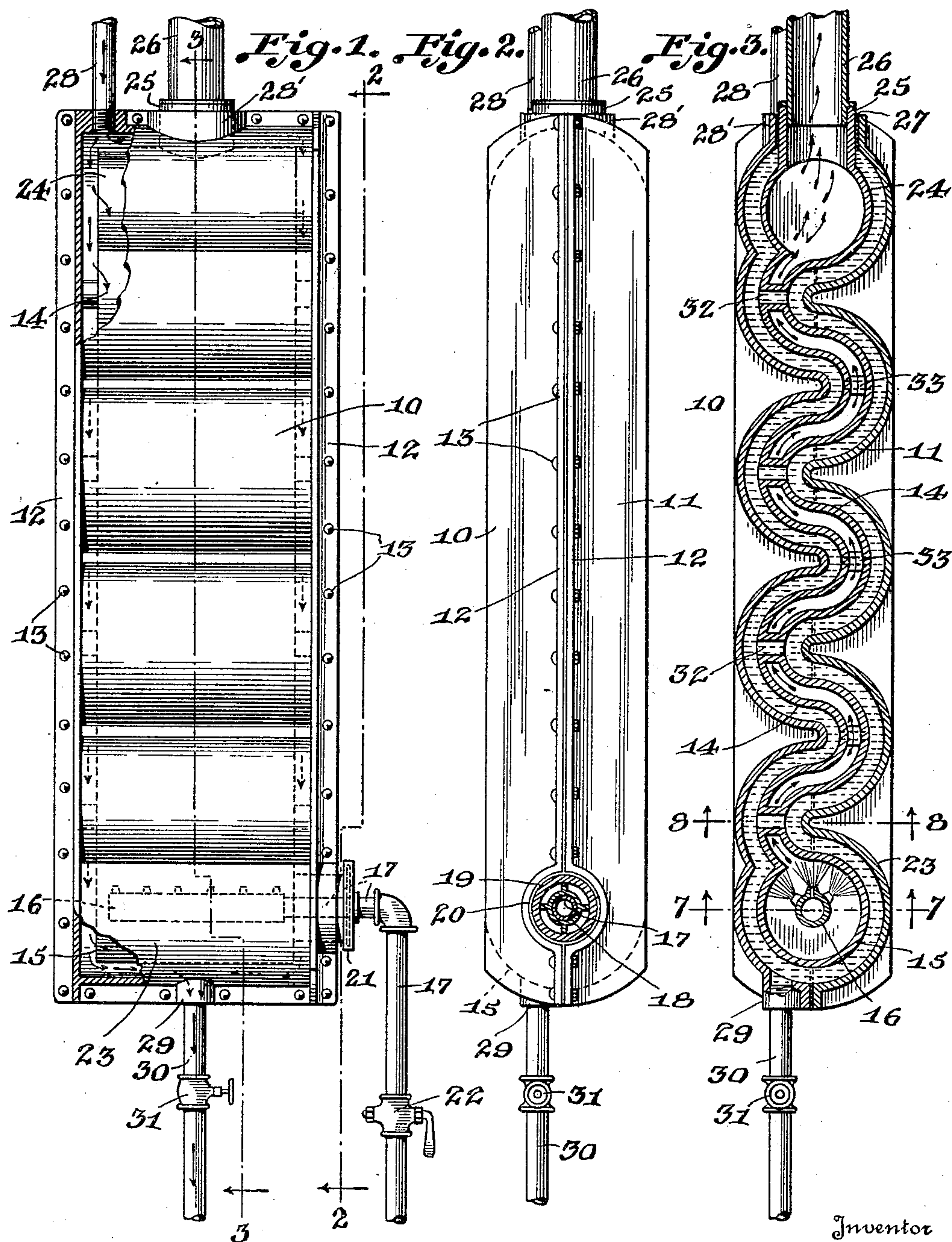
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1,805,165

HOT WATER HEATER

Filed Feb. 14, 1930

2 Sheets-Sheet 1



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Fig. 4.

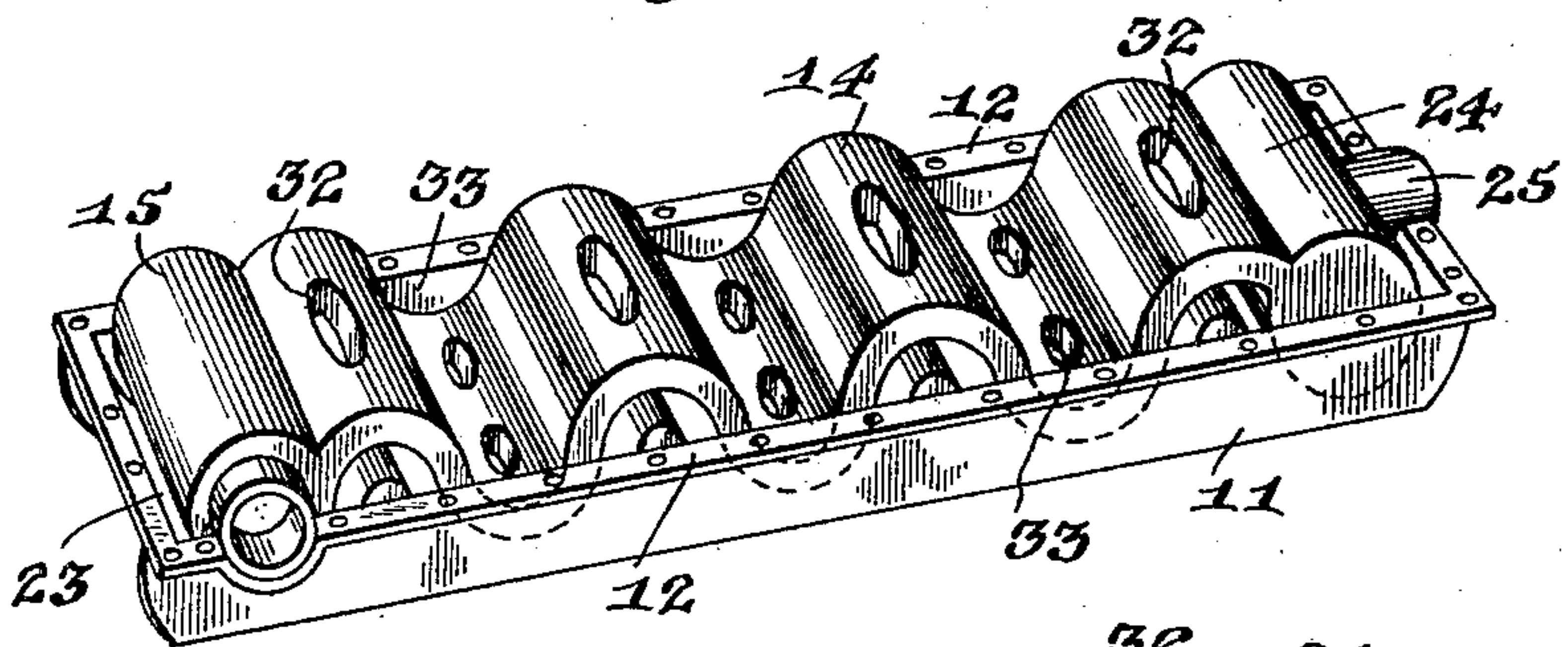


Fig. 5.

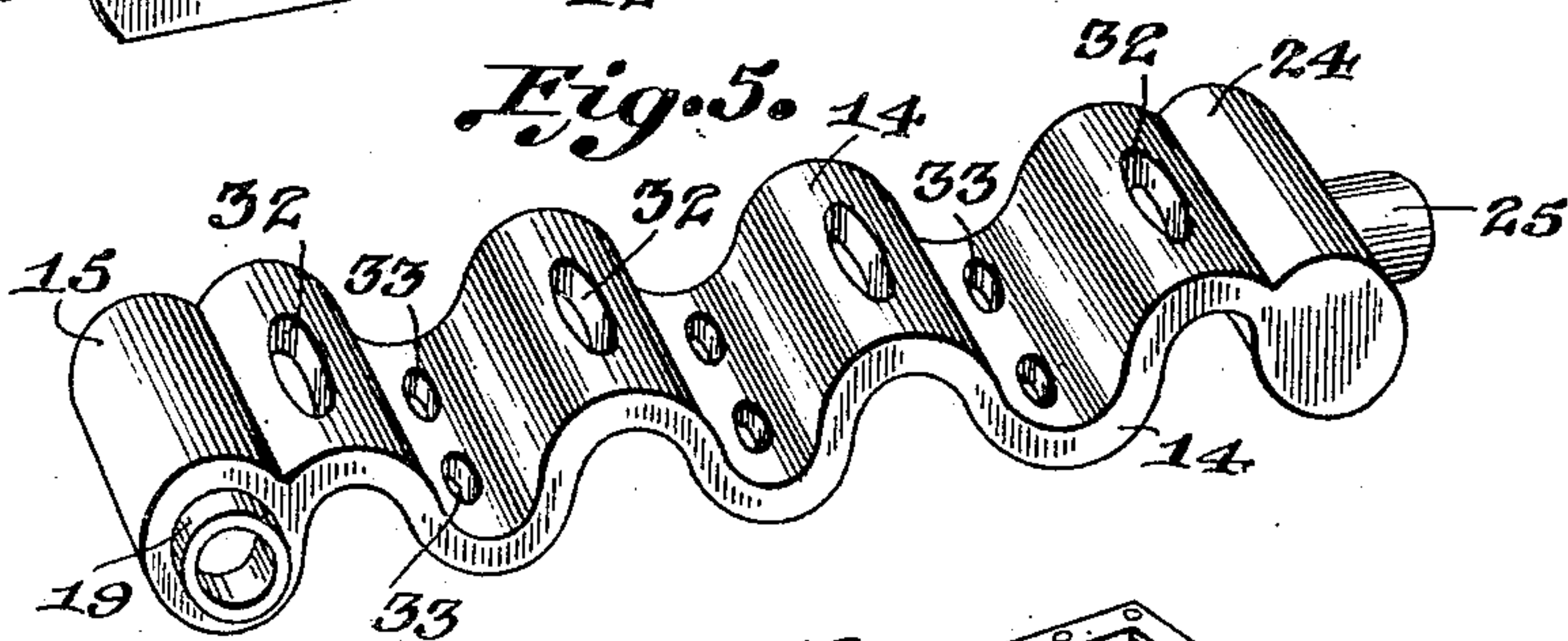


Fig. 6.

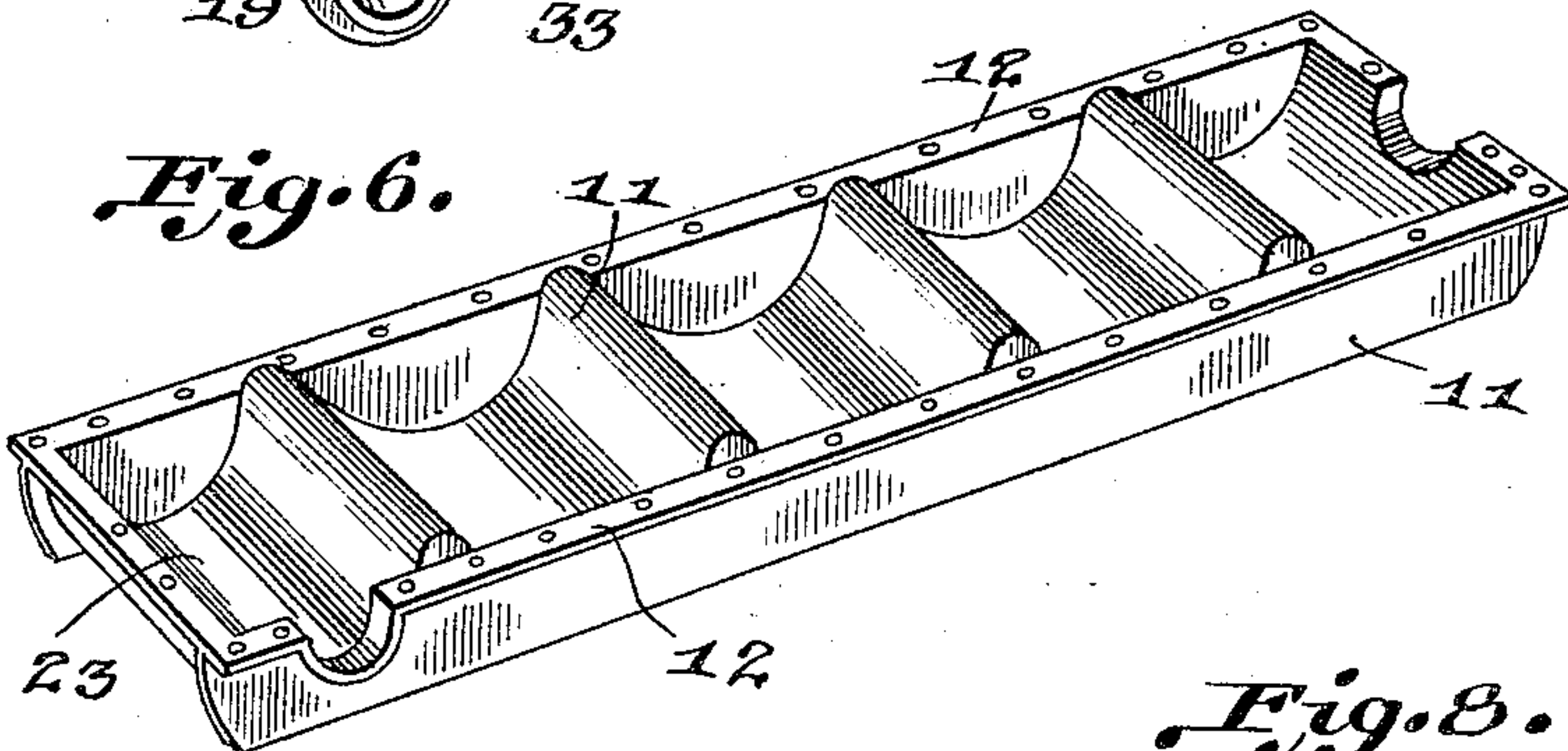


Fig. 7.

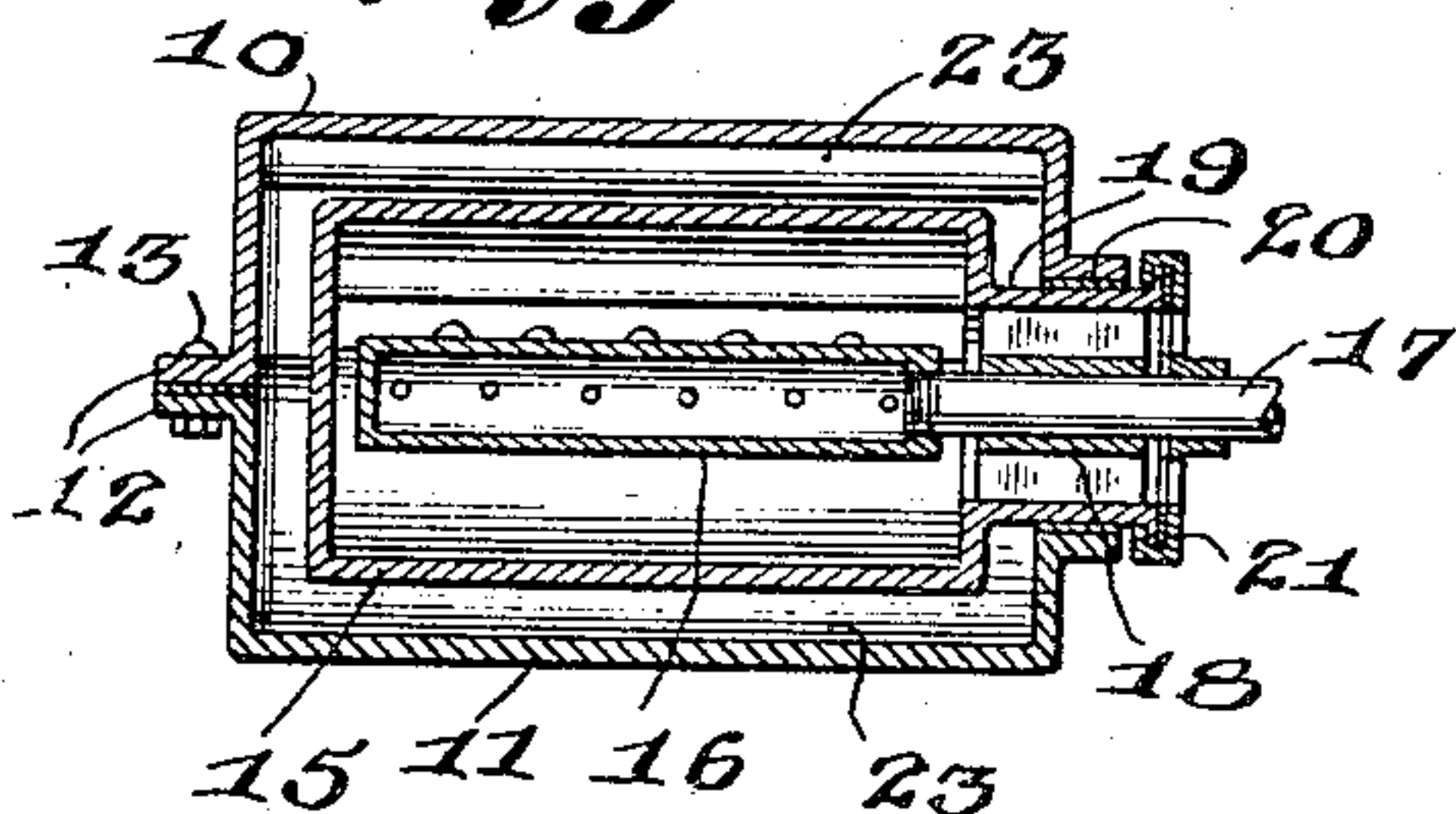
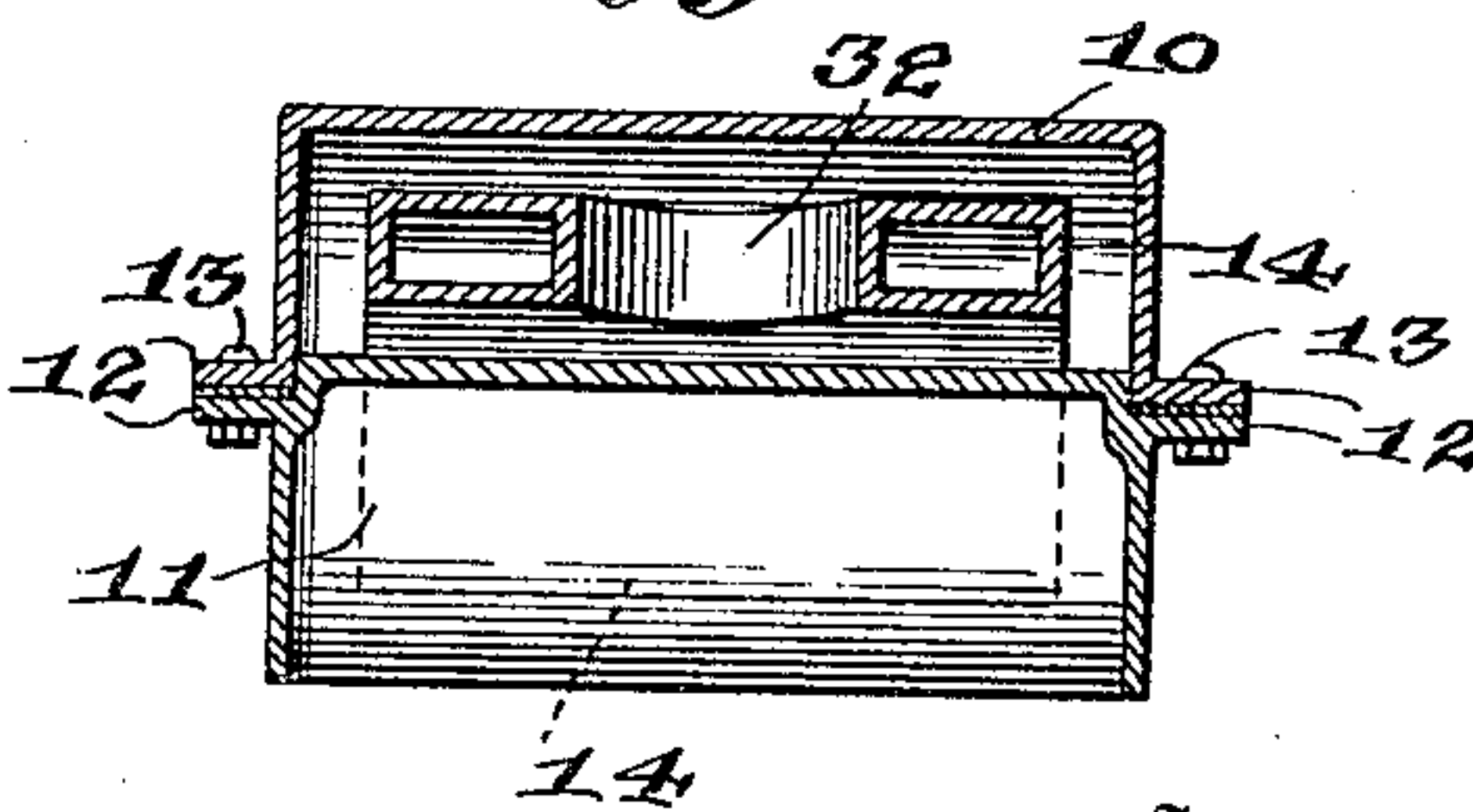


Fig. 8.



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UNITED STATES PATENT OFFICE

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HOT WATER HEATER

Application filed February 14, 1930. Serial No. 428,471.

The present invention relates to a hot water heater, adapted particularly for use with hot water storage tanks in private houses, although it may be well adapted to other uses.

5 An object of the present invention is to provide a hot water heater of the domestic type which is relatively small and compact so as to take up but little room, which may be made of pressed steel, galvanized or cast iron, or
10 the like and which preferably uses a gas burner as the source of heat.

Another object of the present invention is to provide a hot water heater of this character which is constructed in sections so shaped that
15 the sections may be quickly and easily separated so as to clean out mud and other accumulations collecting in the lower or pocket portions of the heater and which may be easily assembled and sealed tightly against leakage
20 so that the water space in the heater may be kept free and unobstructed and thus maintain the heater at a high point of efficiency throughout its life.

Another feature of the present invention is to provide a hot water heater wherein the
25 outer walls of the heater comprise a water jacket and the flue for the products of combustion is disposed between the jacket walls so as to conserve and utilize to the utmost the
30 heat which is generated in the burner, and to so construct the heater that both the flue for the products of combustion and the spaces for the water columns are of serpentine form and are so interfitted as to maintain the water
35 jacket in surface contact with the heating flue throughout a relatively long distance as compared with the height of the device.

A still further object of the present invention is to provide a construction of hot water
40 heater which by but slight modification may be made in larger sizes and may be used in multiple for use in hot water heating plants.

With the foregoing and other objects in view, the invention will be more fully described hereinafter, and will be more particularly pointed out in the claims appended
45 hereto.

In the drawings, wherein like symbols refer to like or corresponding parts throughout
50 the several views.

Figure 1 is a side elevation of a hot water heater constructed according to the present invention, parts being broken away to show the interior construction.

Figure 2 is an edge view of the same, partly
55 in section, taken along the line 2—2 of Figure 1.

Figure 3 is a vertical cross section taken through the hot water heater substantially on the line 3—3 of Figure 1. 60

Figure 4 is a perspective view of the heater with one side section removed and showing the flue member in place.

Figure 5 is a detail perspective view of the
65 flue member.

Figure 6 is a detail perspective view looking at the inner side of one of the casing or shell sections.

Figure 7 is a horizontal section taken through the lower portion of the heater on
70 the line 7—7 of Figure 3, showing one type of burner which may be used, and

Figure 8 is also a cross section taken through the lower part of the burner on the
75 line 8—8 of Figure 3, showing one of the cross passages for the water through the central flue.

Referring now to the drawings, 10 and 11 designate a pair of opposed shells or sections forming the outer casing of the heater. The
80 sections 10 and 11 may be of any desired exterior configuration and are preferably adapted to be disposed vertically as shown in Figures 1, 2 and 3, and are similarly but
85 reversely constructed so as to interfit at their inner portions and provide a sinuous or serpentine passage between the sections when the same are brought together. Each section, 10 and 11, is provided with a marginal
90 attaching flange 12 which extends entirely around the free edge portion of the adjacent section, and the flanges 12 are adapted to be brought into abutting relation and secured together by bolts 13 or the like for sealing
95 the sections 10 and 11 together. The bolts 13 are employed for the purpose of facilitating the separation of the sections to clean out the interior thereof.

Fitting between the sections 10 and 11, and
100 spaced inwardly from the inner walls there-

of is a flue member 14 which comprises spaced apart walls providing a flue therebetween and which also provide between the same and the adjacent inner walls of the sections 10 and 11 a water jacket or space through which water is adapted to be circulated for heating by contact with the walls of the flue member 14.

The flue member 14 is given corrugated form corresponding to the form of the inner walls of the sections 10 and 11 and which is adapted to follow the same throughout the length and width of the heater. The lower end of the flue member 14 is provided with a cylindrical section 15 adapted to receive a burner 16 or the like therein for supplying the heat, and any conventional burner 16 suitable for the purpose may be employed.

As shown particularly in Figures 1, 3 and 7 the burner 16 may comprise a pipe which is perforated and provided with upwardly and laterally projecting tips or nozzles through which gas may be projected, the gas burning in the cylindrical portion 15 and the products of combustion passing upwardly through the serpentine passageway in the flue member 14. The burner 16 may be supported upon a pipe 17 mounted in the hub of a spider 18 fitted in a sleeve portion 19 extending laterally from one end of the cylindrical portion 15 and which is sealed by a packing 20 through the edge wall of the heater formed between the meeting edges of the sections 10 and 11. A suitable air control device 21 may be mounted upon the outer end of the sleeve portion 19 for regulating the flow of air through the spider 18 to the interior of the cylindrical section 15 so as to supply the burner with the requisite air to produce a complete combustion of the gas or other fuel employed.

The pipe 17 may be provided with a valve 22 or the like therein for controlling the flow of gas to the burner 16. The lower portion of the shell or casing is correspondingly shaped to provide an outer drum or cylindrical part 23 so as to provide a water wall or space about the cylindrical portion 15. The upper end of the flue member 14 terminates in a transversely extending drum 24 which is provided intermediate its ends with an upstanding sleeve 25 adapted for connection with a flue pipe 26 or the like for carrying off the products of combustion after passing throughout the entire length of the flue member 14. The sleeve 25 is held by a packing 27 between the semi-circular flanges 28' formed upon the upper end portions of the shell sections 10 and 11 so as to seal the water space about the sleeve 25.

An inlet pipe 28 is threaded into the upper end of one of the shell sections, such as the section 10 as shown, to supply water to be heated to the device. The same section 10 may also be provided at its lower end

with an internally threaded nipple 29 into which is threaded one end of an outlet pipe 30, the latter being provided with a valve 31 controlling the outflow of the heated water from the device.

For the purpose of admitting of the cross flow of water from one side to the other within the heater, the flue member 14 may be provided at suitably spaced apart points with transverse slots or passages 32 and 33. The slots 32 may be relatively large and formed in the bends or curved portions of the flue member at one side thereof while the slots 33 may be relatively small and may be provided in desired numbers in the curved portions at the opposite side of the flue member 14, as shown clearly in Figures 4 and 5.

The heater thus constructed comprises but the outer or shell members 10 and 11 which are sealed together and which enclose a single flue member, the burner 16 and its parts being all the additional features which are necessary to complete the heater. The shell sections 10 and 11 and the flue member 14 are given serpentine form at their inner opposite walls in order to provide relatively long water and products of combustion passages through the heater and to bring the passages with their walls in surface contact with each other throughout the entire length of the heater.

The flue section or member 14 provides a fire box which extends to the desired extent lengthwise in the heater and the cross passages or openings 32 and 33 may be eliminated if desired or may be used in any other arrangement than as shown.

It is also evident that the outer sides of the shell sections 10 and 11 may be corrugated to conform to the inner walls thereof as is shown in the present instance, or may be given any other desired configuration dependent upon the exterior shape which it is desired to impart to the device as a whole.

In use, the device is mounted in any suitable manner in a vertical or upright position such as is shown in Figures 1, 2 and 3. The burner 16 is mounted in the drum or cylinder 15 and the air valve 21 is adjusted so as to regulate the burning of the gas or other fuel which is fed through the burner 16. The products of combustion rise in a sinuous passage up through the hollow flue member 14 and into the outlet drum 24 from which the products of combustion are conducted to the pipe 26.

The middle or flue section is a separate complete unit in itself and the outer shell or casing which surrounds and encloses this unit may be made in the two sections 10 and 11, shown in the accompanying drawing, or may be constructed of any number of sections, and the shell may be otherwise constructed than as disclosed to provide the baffles disposed in lengthwise staggered relation

throughout the height of the shell, so as to interfit with the bends or angles of the central unit 14.

While the heat is applied to the central unit in the present instance, of course, any other desired arrangement may be resorted to by reversing the flue and water passage elements to meet various conditions desired and of manufacture and installation.

It is obvious that various other changes and modifications may be made in the details of construction and design of the above specifically described embodiment of this invention without departing from the spirit thereof, such changes and modifications being restricted only by the scope of the following claims.

What is claimed is:—

1. A hot water heater, comprising a pair of shell sections provided with abutting flanges at their marginal edge portion, a packing interposed between said flanges for sealing the sections together, detachable means engaging said flanges for securing the sections detachably together and admitting of the separation of the sections for cleaning the interior thereof, an independent flue section enclosed within said shell sections and provided at its lower end with a burner receiving drum opening through one edge portion of the shell sections and provided at its upper end with an outlet drum provided with an outlet pipe leading through the top of the shell sections, means for circulating water downwardly through the shell sections and about said flue section, said flue section and the inner walls of said shell sections being corresponding corrugated throughout substantially the height of the heater to provide relatively long sinuous flue and water passages.

2. A hot water heater, comprising a pair of opposed relatively flat shell sections, means for detachably securing and sealing the sections together to hold water circulated there-through, an independent relatively flat flue section removably mounted between the shell sections and being spaced inwardly from the inner walls of the shell sections, said flue section and said inner walls of the shell sections being correspondingly and transversely corrugated throughout their length to provide relatively narrow sinuous flue and water passages of substantially the width of the heater, and said flue section provided at opposite sides and at the bends thereof with transverse passages adapted to permit cross currents of water passing through the flue section from side to side between the shell sections.

3. A hot water heater, comprising a pair of opposed relatively flat shell sections, means for detachably securing and sealing the sections together to hold water circulated there-through, an independent relatively flat flue

section removably mounted between the shell sections and being spaced inwardly from the inner walls of the shell sections, said flue section and said inner walls of the shell sections being correspondingly and transversely corrugated throughout their length to provide relatively narrow sinuous flue and water passages of substantially the width of the heater.

In testimony whereof I affix my signature.

LOUIS S. DENNEY.