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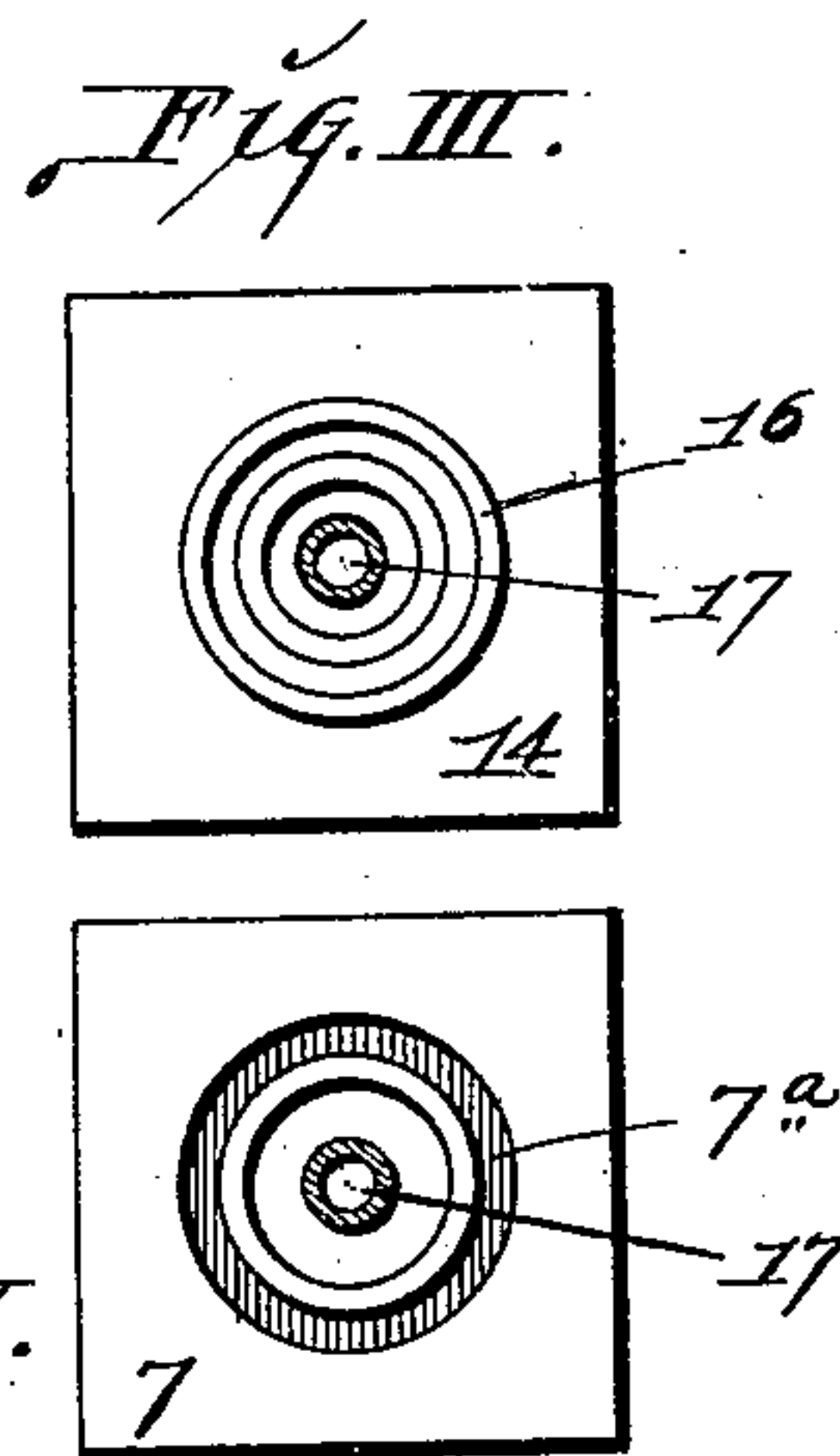
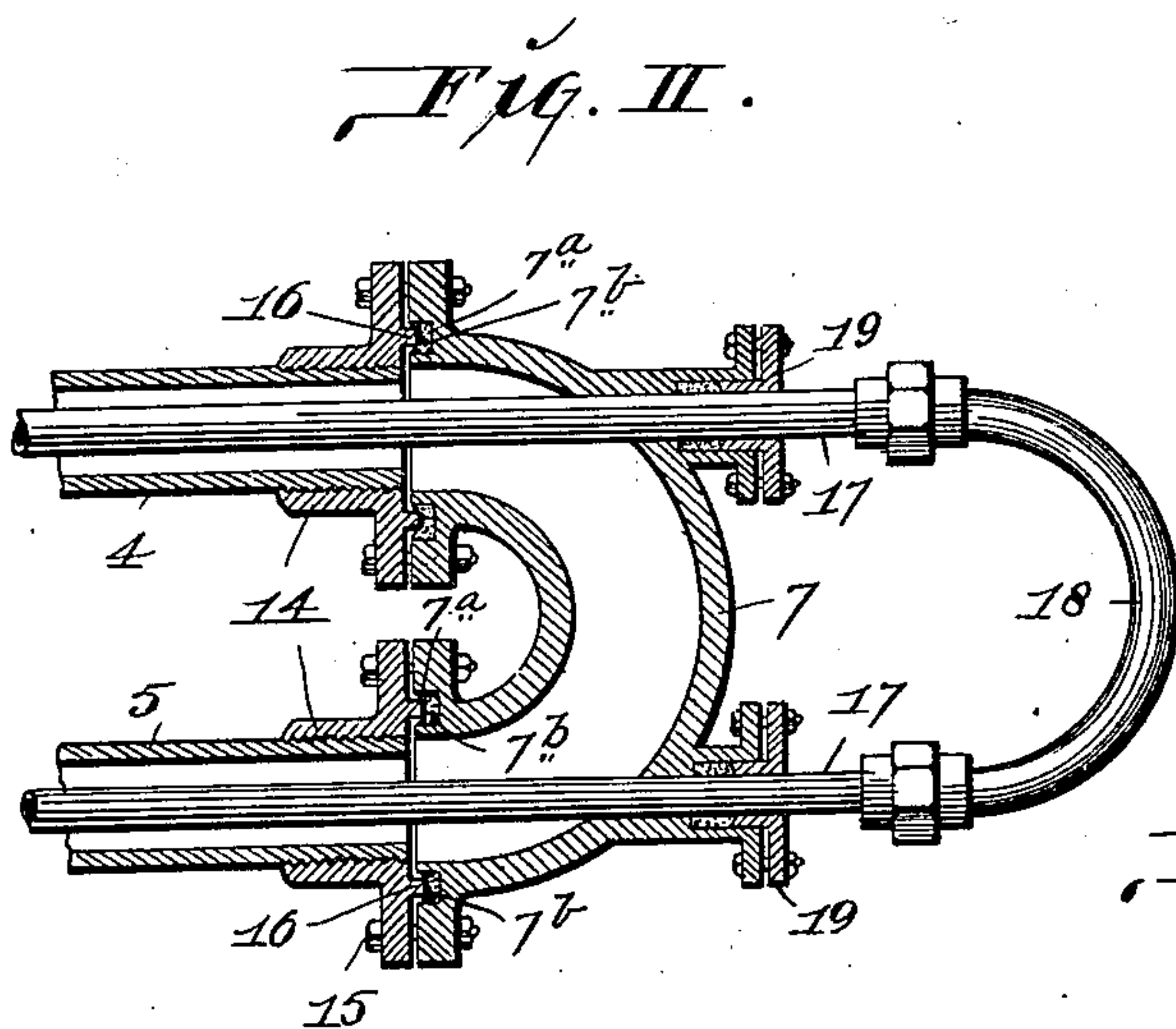
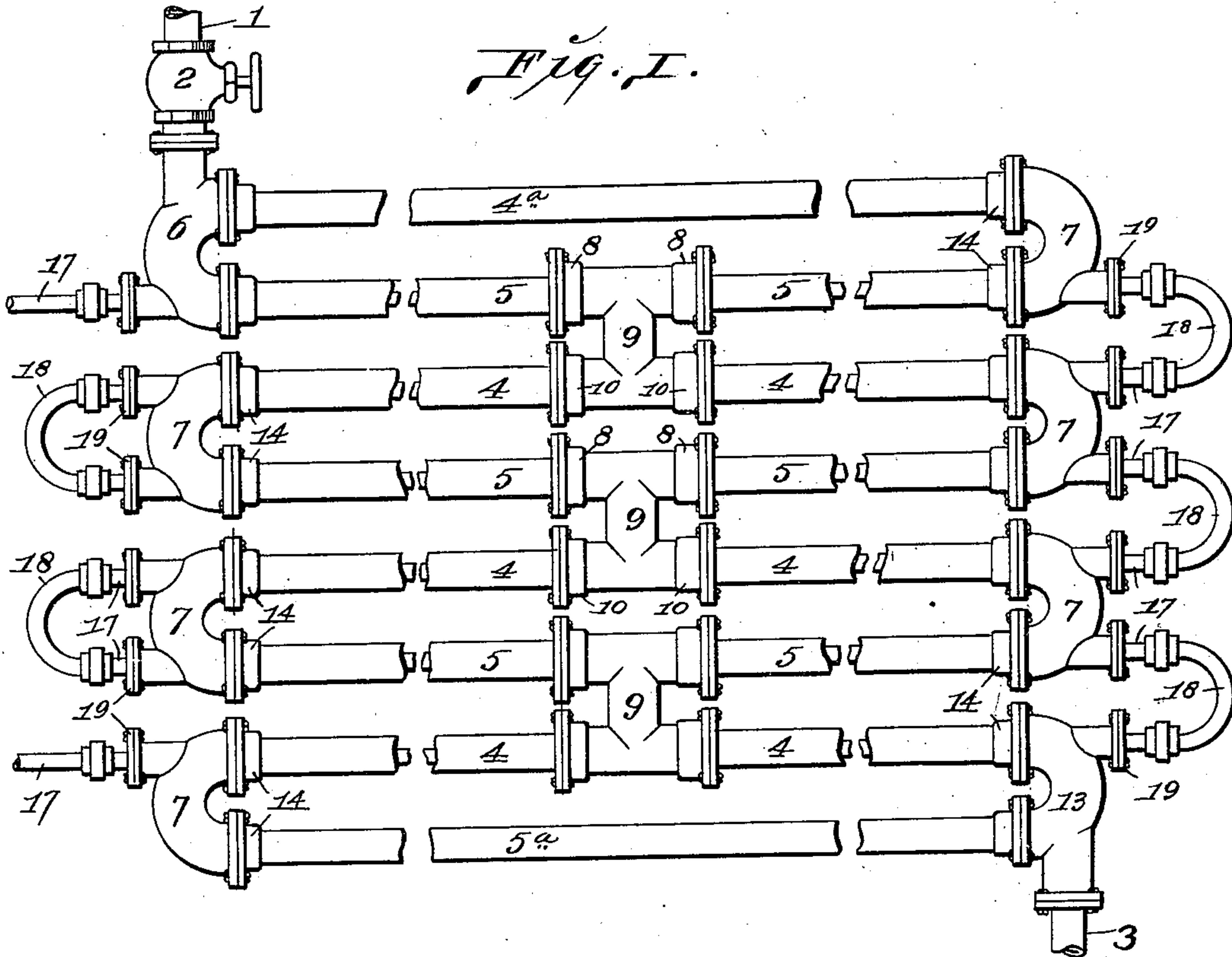
Patented Jan. 29, 1901.

E. KUPFERLE.  
CONDENSING COIL.

(Application filed Dec. 17, 1900.)

2 Sheets—Sheet 1.

(No Model.)



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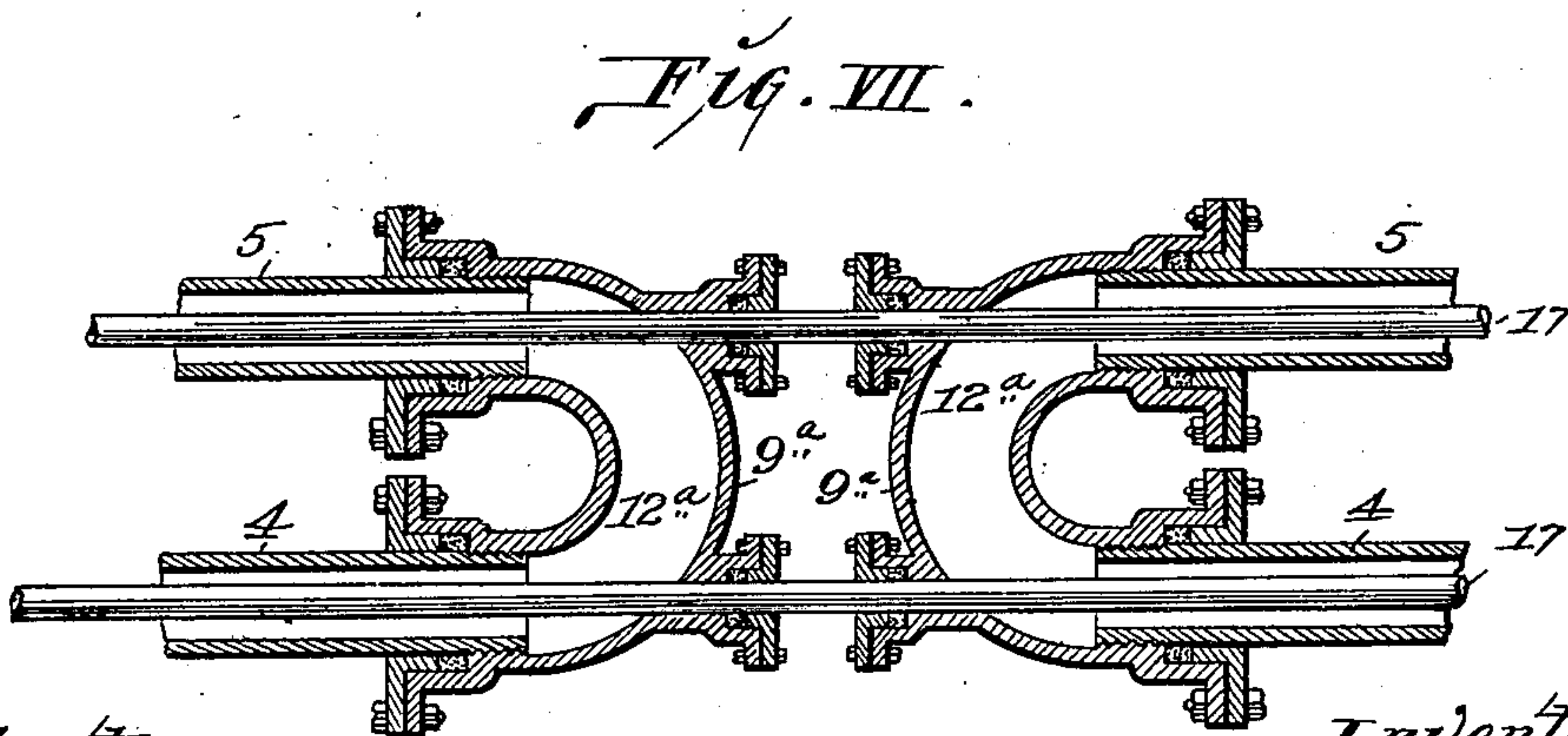
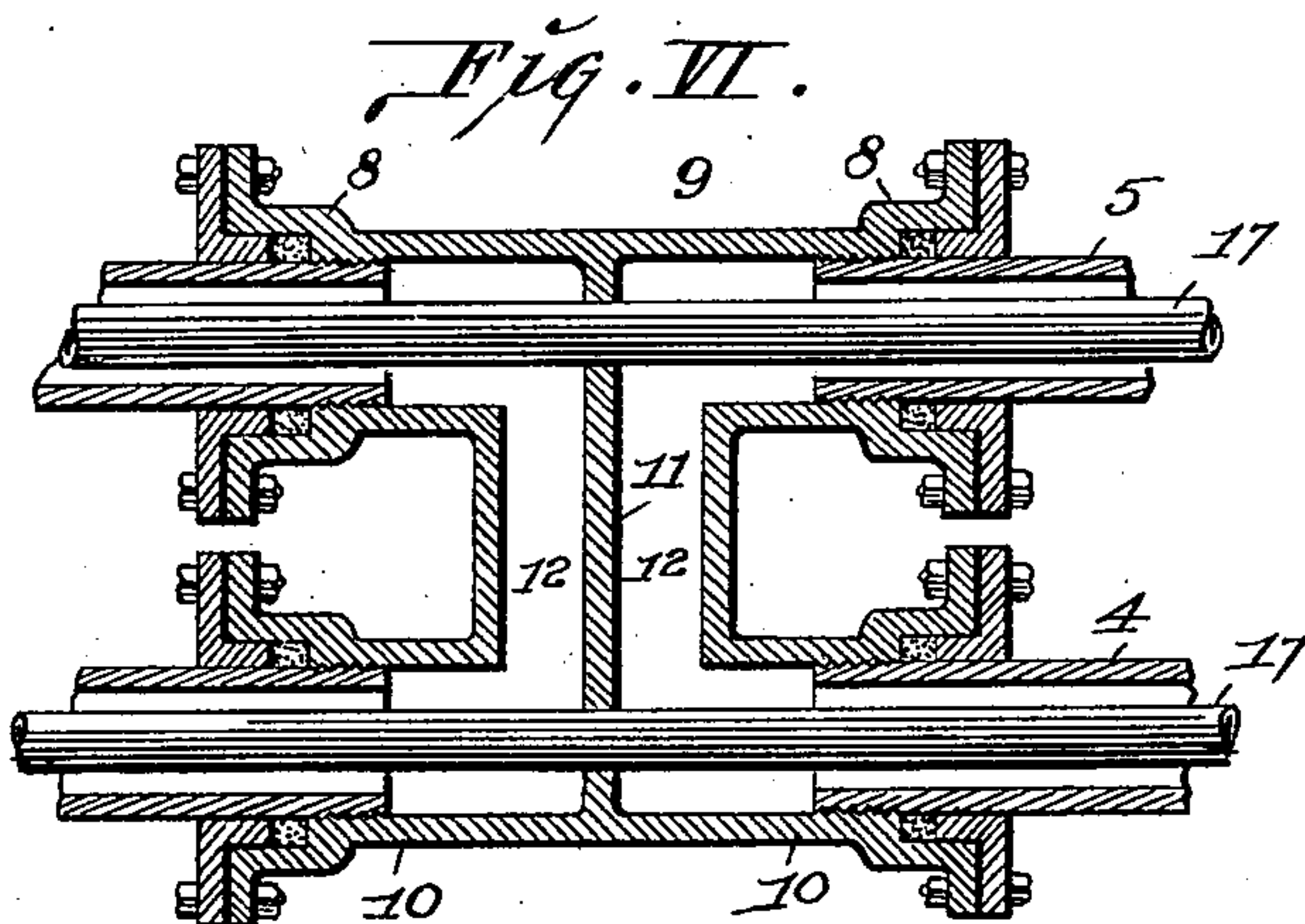
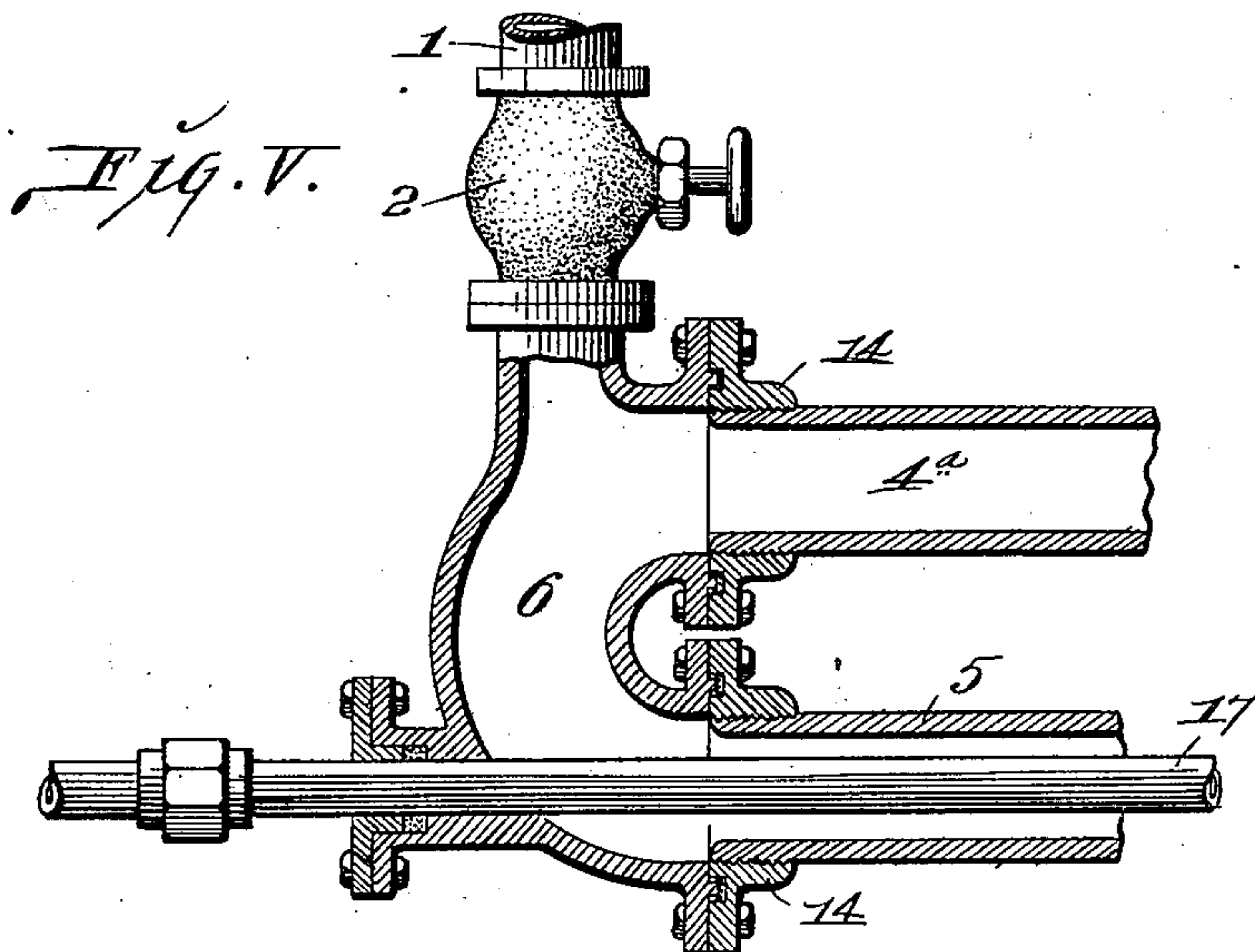
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2 Sheets—Sheet 2.



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# UNITED STATES PATENT OFFICE.

EDWARD KUPFERLE, OF ST. LOUIS, MISSOURI.

## CONDENSING-COIL.

SPECIFICATION forming part of Letters Patent No. 666,781, dated January 29, 1901.

Application filed December 17, 1900. Serial No. 40,119. (No model.)

*To all whom it may concern:*

Be it known that I, EDWARD KUPFERLE, a citizen of the United States, residing in the city of St. Louis, in the State of Missouri, have invented certain new and useful Improvements in Condensing-Coils, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

My invention relates to a condensing-coil for use in connection with refrigerating machinery for liquefying the gas passed there-through; and the invention consists in features of novelty hereinafter fully described, and pointed out in the claims.

The invention has for its object the production of a condensing-coil wherein the gas to be liquefied is caused to pass at two sides of the coil in two separate and independent courses from an inlet common to both sides to an outlet common to both sides. By this arrangement a result is obtained equivalent to the service of two coils of the ordinary type, and the associated coils are arranged in compact form to perform in unison the functions required of them.

Figure I is a view showing my improved coil in elevation with parts broken out. Fig. II is an enlarged sectional view of one end of one of the gas-pipe sections and the coexisting part of the water-pipe that passes through the section. Fig. III is an enlarged detail face view of one of the packing-glands belonging to the joints between the gas-pipes and the elbows connected thereto. Fig. IV is an enlarged detail face view of one end of one of the gas-pipe-section-connecting elbows. Fig. V is an enlarged longitudinal sectional view of the inlet union and adjacent pipes. Fig. VI is an enlarged longitudinal sectional view of one of the central gas-pipe-connecting unions. Fig. VII is an enlarged longitudinal sectional view illustrating a modification of the central union.

1 designates the inlet-pipe, through which the gas to be condensed is introduced into the coil, said pipe being preferably provided with a suitable valve 2.

3 designates the outlet-pipe, leading from the coil.

4 and 5 designate a series of sections of gas-pipe, said sections being joined in pairs

throughout the coil at each side of central unions, by which they are connected, and being joined at each outer end by elbows, as will hereinafter appear.

6 designates an inlet-elbow located at one end of the coil, at the top thereof, and connected to one of the upper gas-pipe sections 5 and also to a crossover-pipe 4<sup>a</sup>, that leads across the coil to an elbow 7, through which communication is provided into the upper gas-pipe section 5 at the side of the coil opposite the inlet. It will therefore be seen that the gas introduced into the coil from the inlet-pipe 1 is permitted to enter alike the pipe-section 5 at the inlet side by passing directly thereinto from the inlet-elbow 6 and the pipe-section 5 at the opposite side of the coil by flowing through the crossover-pipe and through the elbow 7.

The inner ends of the upper pair of gas-pipe sections 5 lead to and are joined to upper arms 8 of central unions 9, into which the gas flows after passing through said pipe-sections. The central unions 9 are of I form and, besides the upper arms 8, are equipped with lower arms 10, to which the pipe-sections 4, beneath the sections 5, are connected.

Centrally positioned within the central unions 9 are vertical partitions 11, (see Fig. VI,) that divide the unions into two compartments 12, with one of which the pipes 5 and 4 at one side of the coil have communication, while the pipes 5 and 4 at the opposite side are arranged in communication with the other of said compartments. It will therefore be seen that as the gas passes through the coil at the opposite sides it is shut off from communication with the opposite side of the coil and must make a course downwardly through the side into which it originally entered.

In practical service a portion of the gas passes from the inlet-elbow 6 directly into the upper gas-pipe section 5 at the inlet side, and a portion passes through the crossover-pipe 4<sup>a</sup> to and through the elbow 7 at the opposite side of the coil and therefrom into the gas-pipe section 5 at that side, the flow of gas in both of the pipe-sections 5 being inwardly to the upper union 9. In entering the compartments 12 of the upper union 9 the gas passes therethrough and then outwardly into the gas-pipe sections 4 in an outwardly course



to the elbows 7, connected to the ends of said sections, and after flowing through the last-named elbows enters the next succeeding pair of pipe-sections 5 and again flows inwardly to the central union 9, to which said sections are connected, and through said union to the pipe-sections 4 in the same manner as above described in connection with the first central union. The same course of flow is continued throughout all of the sections of the coil, as will be readily understood, until the gas has passed entirely through the coil and finds outlet therefrom in a liquefied state through the outlet-elbow 13, to which the outlet-pipe 2 is connected.

One of the lower pipe-sections 4 communicates directly with the outlet-elbow 13, and communication from the other section 4 is provided through a crossover-pipe 5<sup>a</sup>, that connects the lower elbow 7 with the outlet-elbow.

The elbows 6, 7, and 13, the pipe-sections 4 and 5, and crossover-pipes 4<sup>a</sup> and 5<sup>a</sup> are connected by glands 14, that are provided with screw-threaded connection to the pipe-sections and pipes. The manner of applying the glands is similar with respect to all of the elbows, and a detailed description with respect the elbows 7 may be considered to apply equally to the connection of the glands to the elbows 6 and 13. Each elbow is provided with an annular groove 7<sup>a</sup>, (see Figs. II and IV,) that contains suitable packing 7<sup>b</sup>. The glands 14 are secured to the elbows by bolts 15 and are provided at their inner sides with annular ribs 16, (see Figs. II and III,) that set in the grooves 7<sup>a</sup> against the packing 7<sup>b</sup> to produce a tight joint at the connection of the pipe-sections 4 and 5 and the elbows.

17 designates a water-pipe composed of sections. The water-pipe passes through the gas-pipe sections throughout the coil and is held centrally positioned in said pipes by the partitions 11 in the central unions. The various sections of the water-pipe are joined together by return-bends 18, located exterior of the elbows 6, 7, and 13, and the openings in said elbows through which the water-pipe sections pass are packed by suitable glands 19, surrounding the pipes and secured to the elbows.

In Fig. VII I have shown a modification wherein the central union partakes of the

form of return-bends 9<sup>a</sup>, to which the sections 4 and 5 are connected and through which the water-pipe 17 passes in common. This construction affords the same feature as the divided union 9 in that the two return-bends provide independent compartments 12<sup>a</sup>, through which the gas passes at each side of the coil without communication with the opposite side of the coil.

I claim as my invention—

1. In a condensing-coil, the combination of two independent series of gas-pipe sections, the sections of the series of each side of the coil being connected at their inner ends to centrally-positioned unions, said unions, said unions being arranged to prevent communication between the pipe-sections at the opposing sides of the coil, inlet and outlet pipes having communication in common with the two series of gas-pipe sections, and a continuous water-pipe extending throughout the interior of said gas-pipe sections, substantially as described.

2. In a condensing-coil, the combination of two independent series of gas-pipe sections connected at their inner ends to centrally-positioned unions, said unions, partitions in said unions by which the series of sections at one side of the unions are separated from communication with the sections at the opposite side, inlet and outlet pipes having communication in common with the two series of gas-pipe sections, and a continuous water-pipe extending throughout the interior of said gas-pipe sections, substantially as described.

3. In a condensing-coil, the combination of two independent series of gas-pipe sections connected at their inner ends to centrally-positioned unions, said unions, partitions in said unions by which the series of sections at one side of the coil are separated from communication with the sections at the opposite side, a crossover inlet-pipe arranged in communication with the gas-pipe sections at both sides of the coil in common, and a crossover outlet-pipe arranged in communication with the pipe-sections at both sides of the coil in common, substantially as described.

EDWARD KUPFERLE.

In presence of—

GEO. H. KNIGHT,  
N. V. ALEXANDER.