

No. 656,553.

Patented Aug. 21, 1900.

H. L. LEACH.

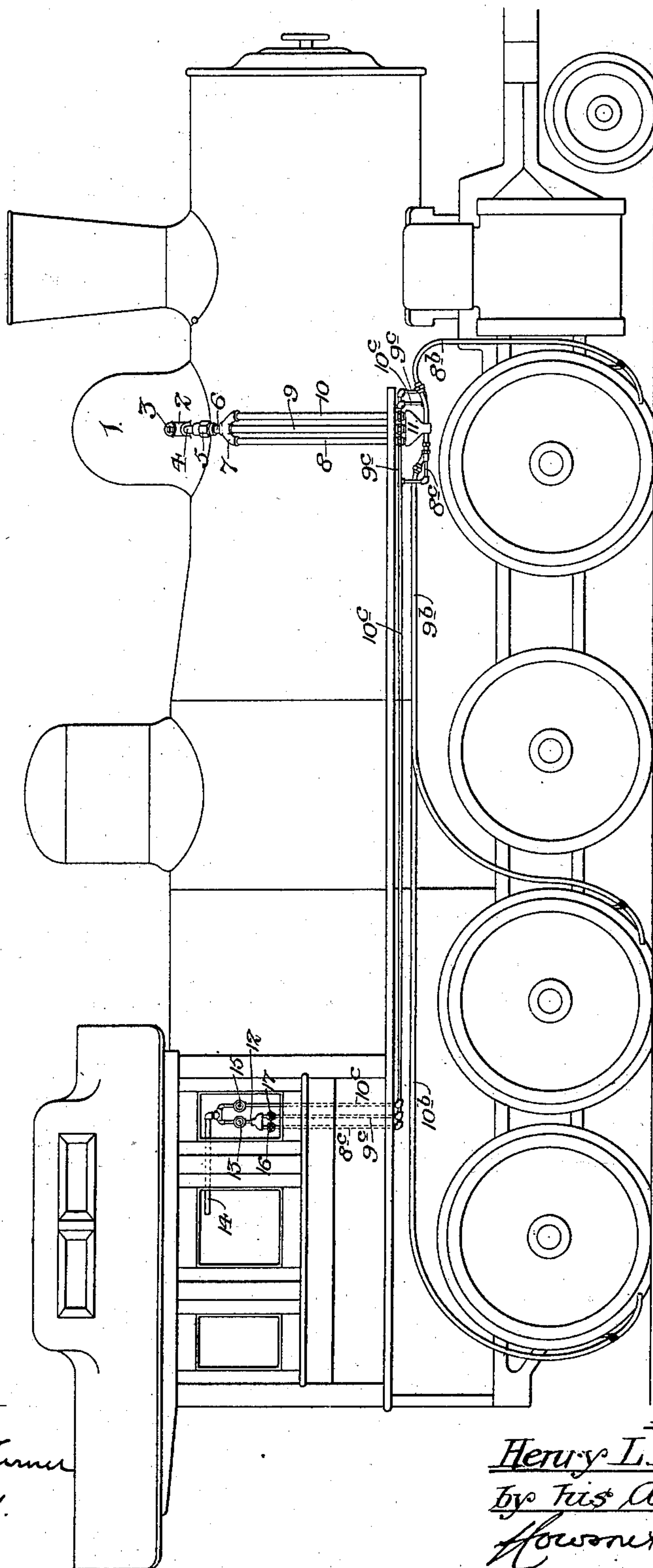
TRACK SANDER FOR LOCOMOTIVES.

(Application filed Aug. 31, 1899.)

(No Model.)

4 Sheets—Sheet 1.

*Fig. 1.*



Witnesses:

*Hamilton S. Turner*  
*Louis M. Whithead.*

Inventor:

*Henry L. Leach.*  
*by His Attorneys:*  
*Howson & Howson*

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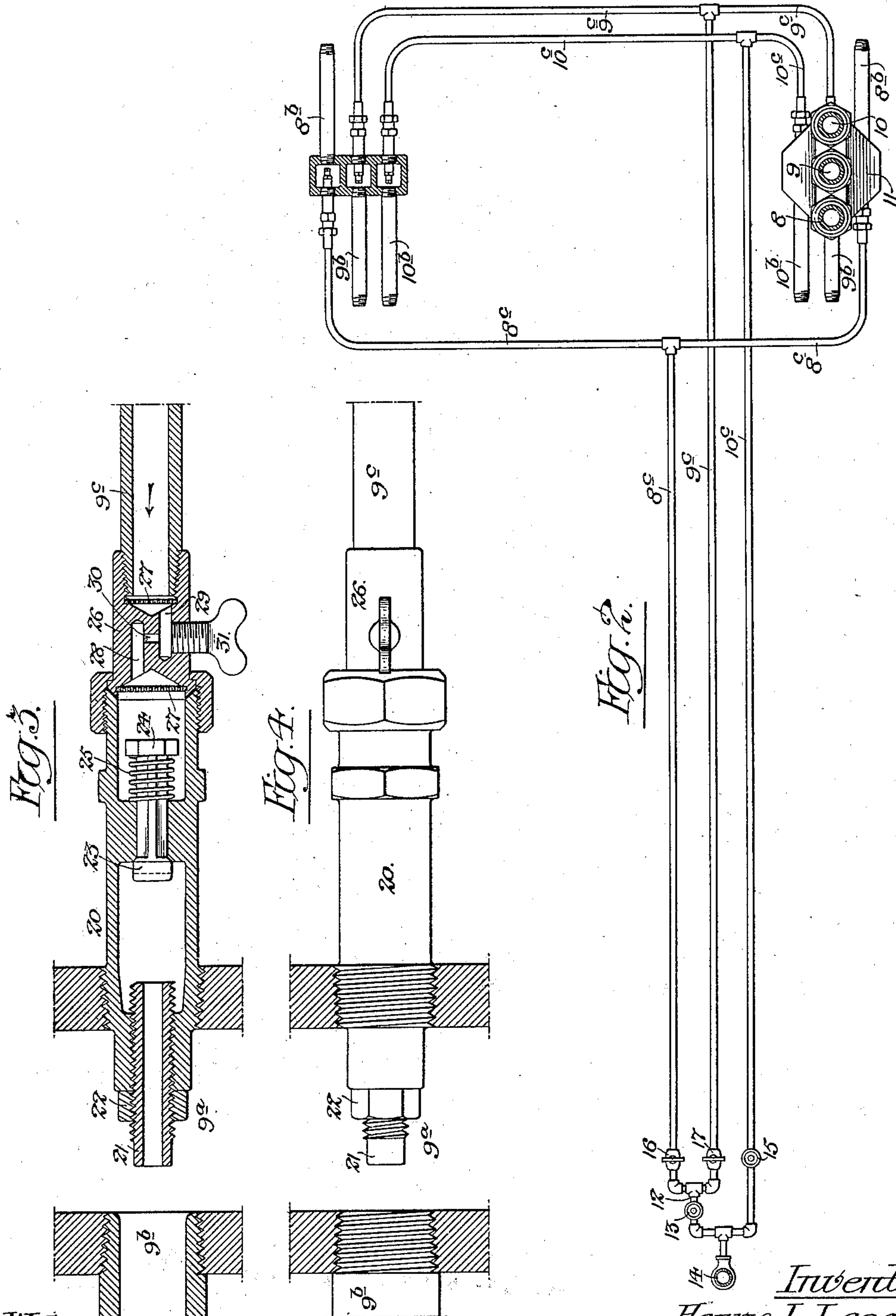
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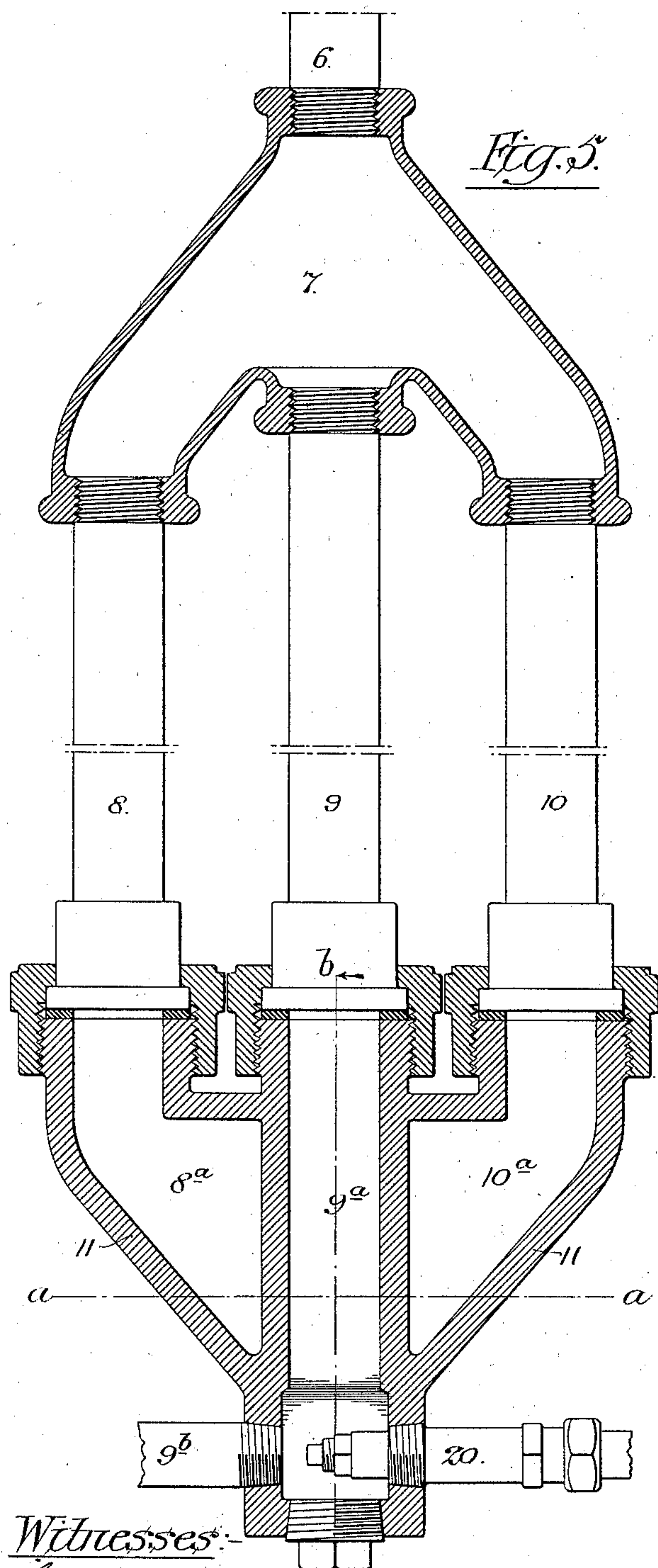
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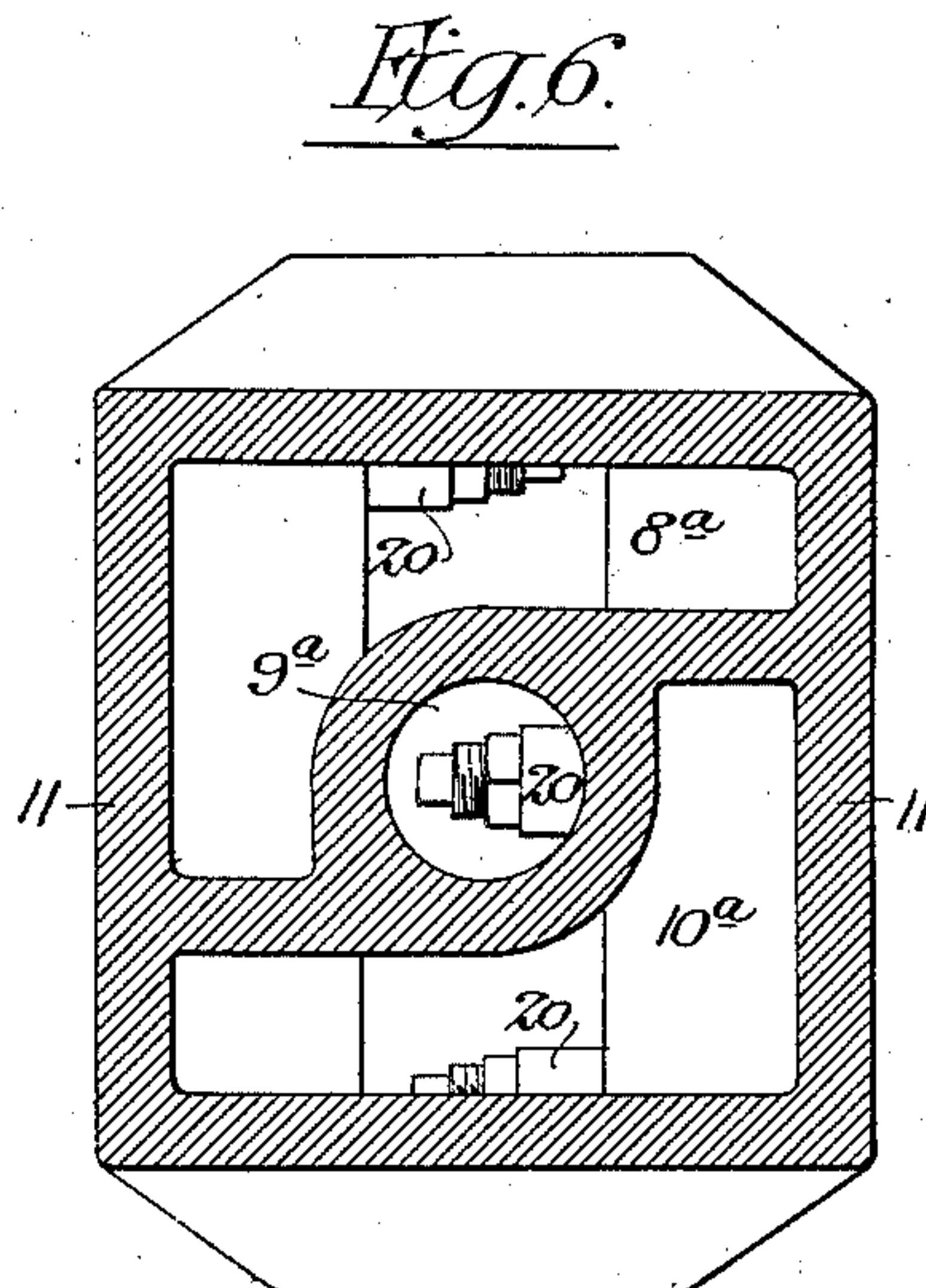
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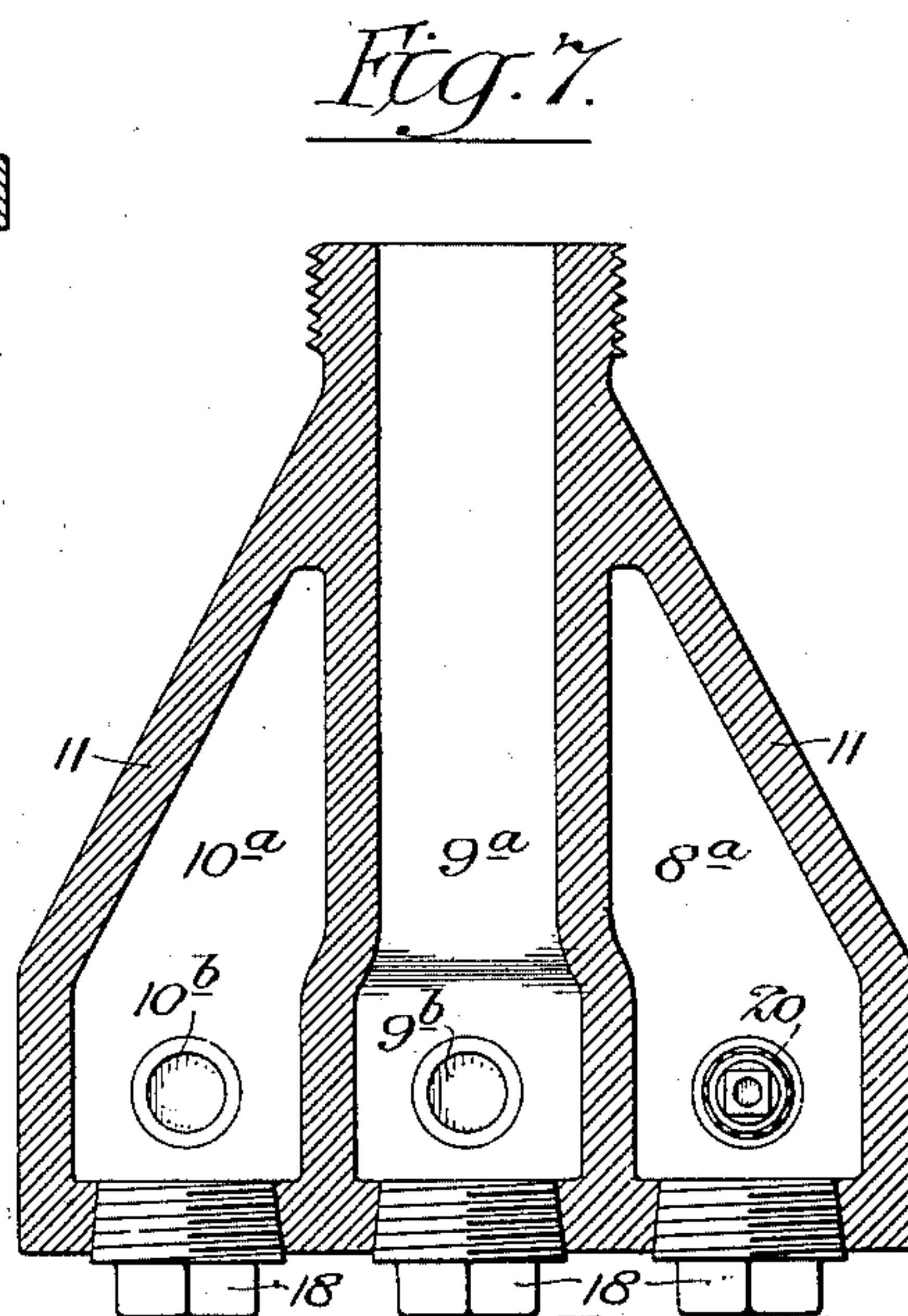
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*Fig. 5.*



*Fig. 6.*



*Fig. 7.*

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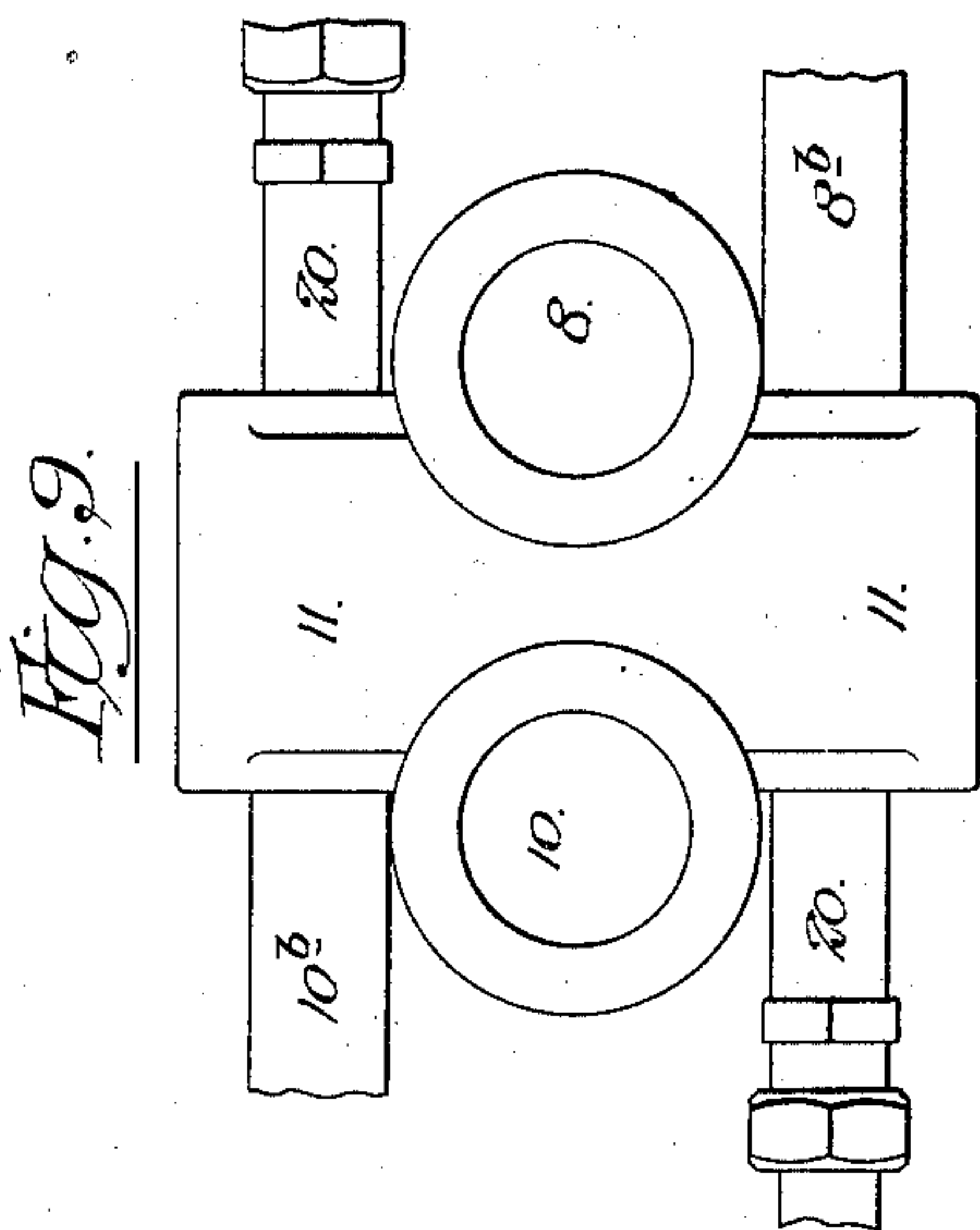
H. L. LEACH.

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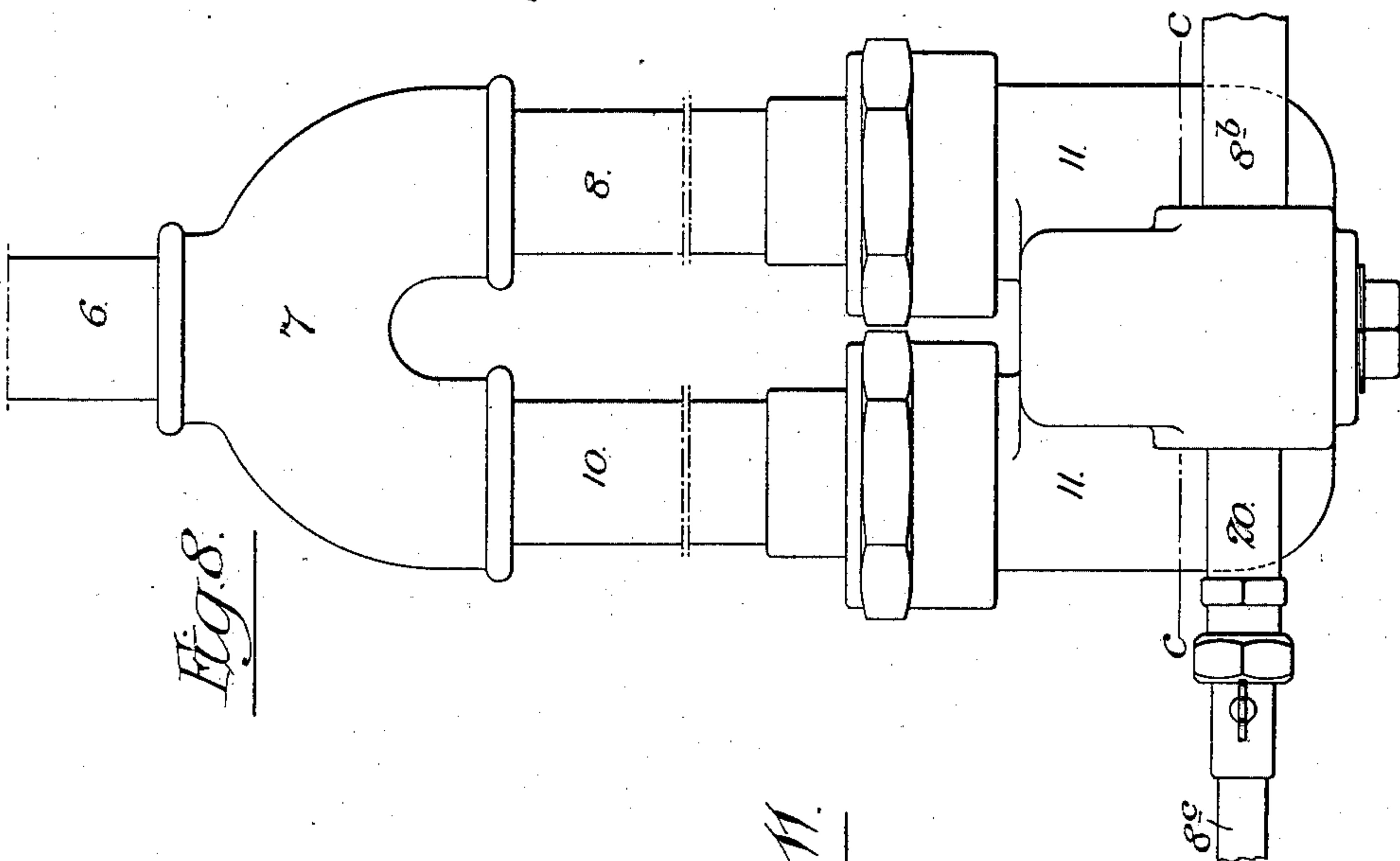
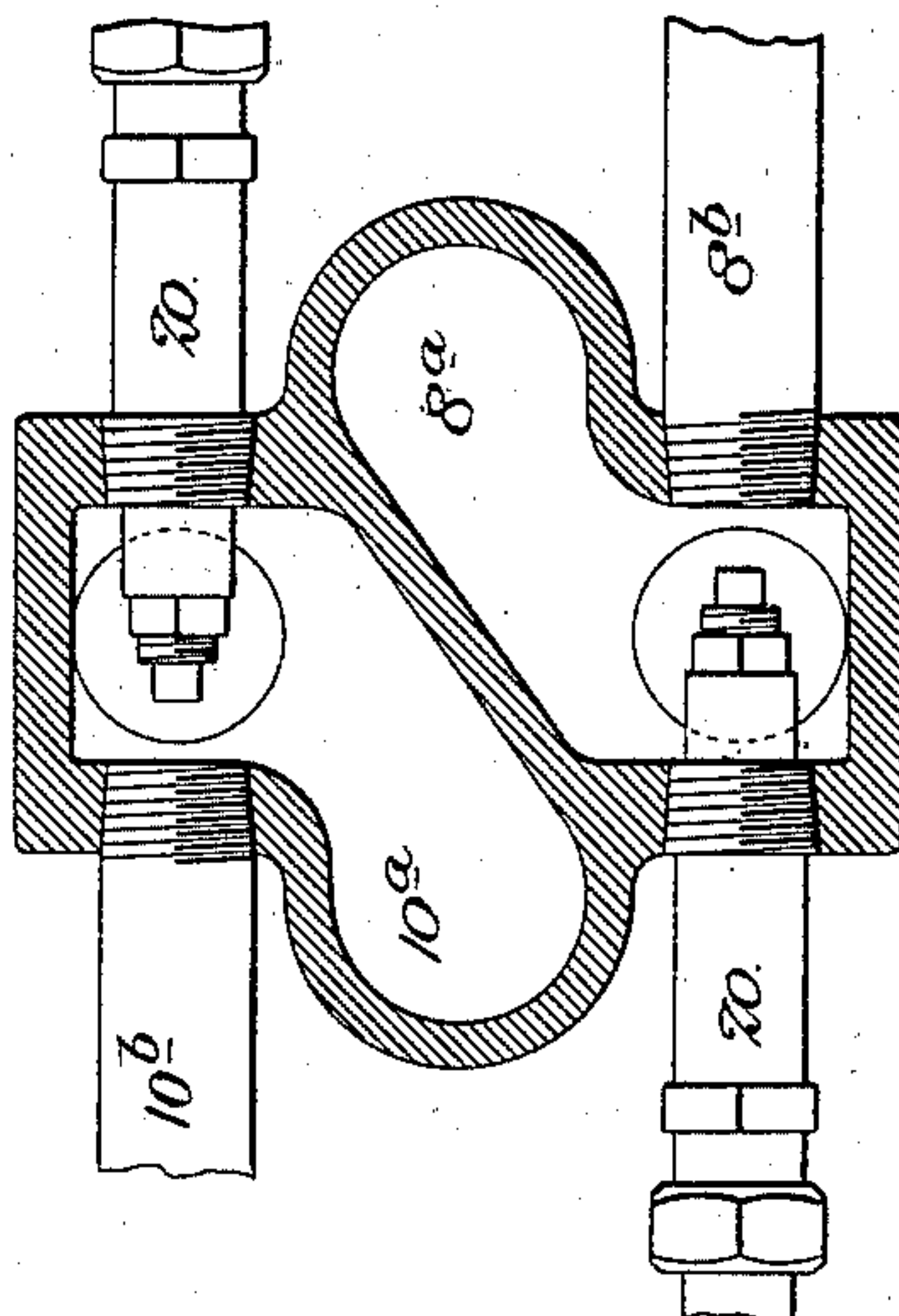
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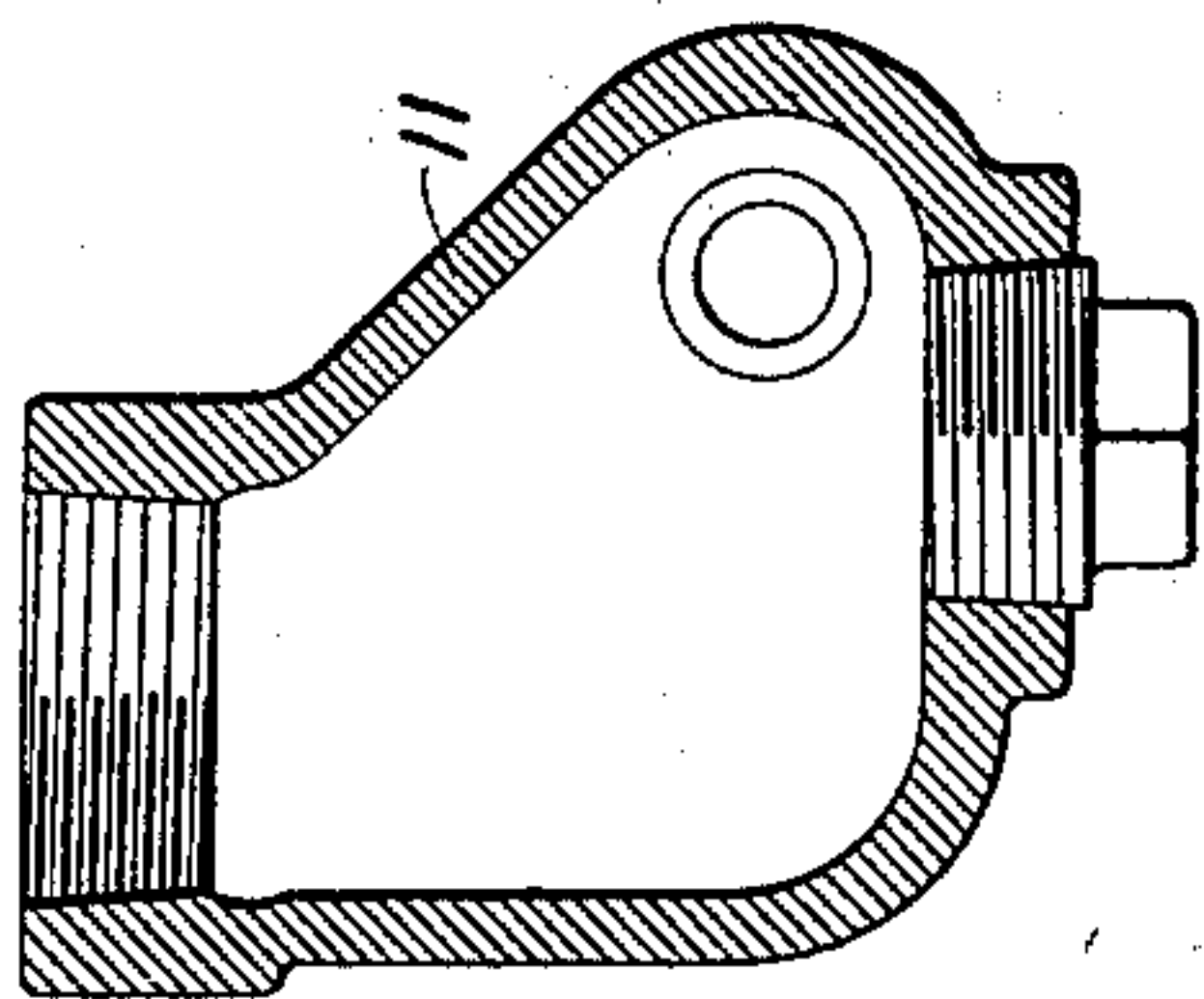
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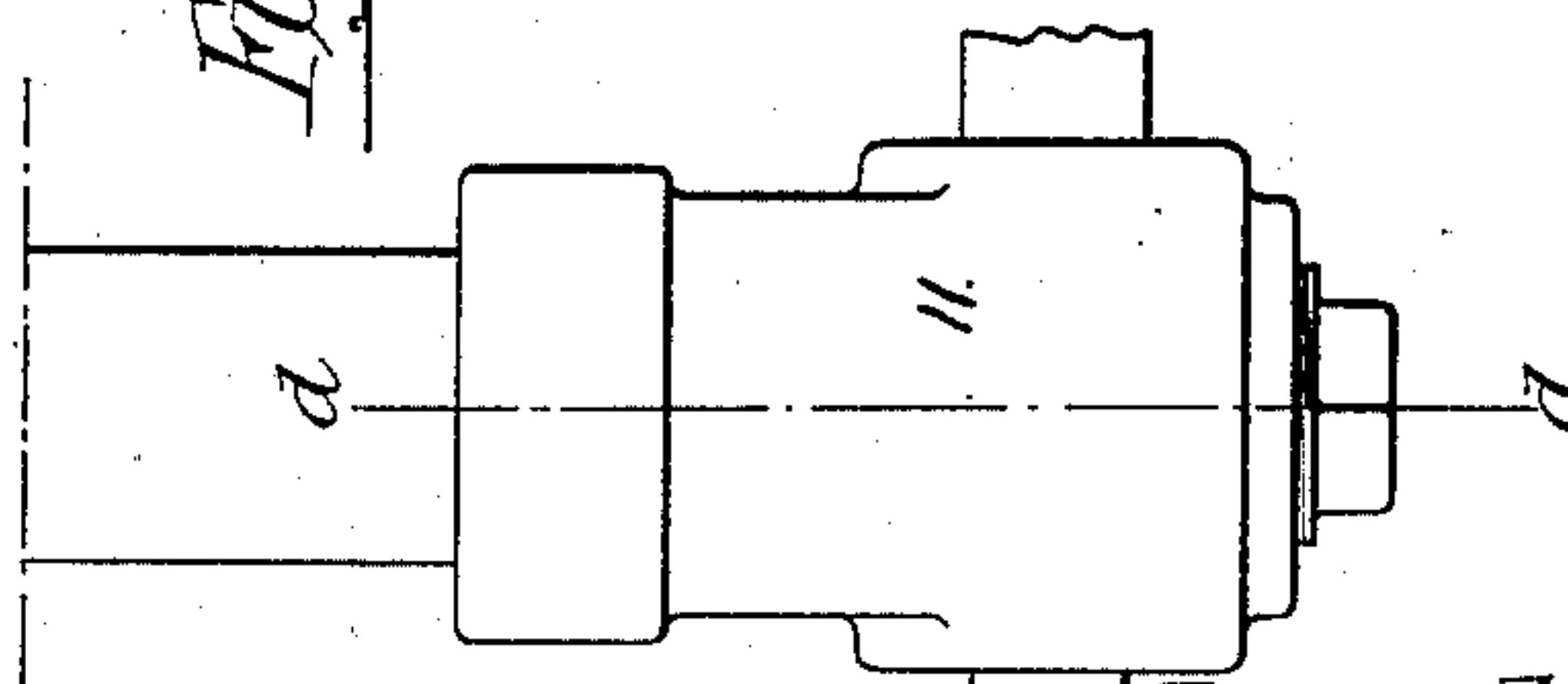
*Fig. 10.*



*Fig. 12.*



*Fig. 11.*



*Witnesses:-*

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*by his Attorneys:*

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# UNITED STATES PATENT OFFICE.

HENRY L. LEACH, OF CAMBRIDGE, MASSACHUSETTS, ASSIGNOR TO THE AMERICAN LOCOMOTIVE SANDER COMPANY, OF CAMDEN, NEW JERSEY.

## TRACK-SANDER FOR LOCOMOTIVES.

SPECIFICATION forming part of Letters Patent No. 656,553, dated August 21, 1900.

Application filed August 31, 1899. Serial No. 729,021. (No model.)

*To all whom it may concern:*

Be it known that I, HENRY L. LEACH, a citizen of the United States, and a resident of Cambridge, Massachusetts, have invented certain Improvements in Pneumatic Track-Sanders for Locomotives, of which the following is a specification.

One object of my invention is to provide efficient means for supplying sand to the point of contact between the driving wheel or wheels of a locomotive and the rail to insure an effective pressure of air for removing obstructions and discharging the sand from the delivery-pipes and to prevent the air from blowing back into the sand-box in case a delivery-pipe is obstructed, so as to prevent the free delivery of sand therefrom, another object being to provide for regulation of the amount of sand delivered, a further object being to prevent choking of the air-blast nozzle, a still further object being to provide for feeding sand at two or more points simultaneously on each side of the engine, as desired, and a final object being to provide a ready means for cutting off the sand from a multiple trap or sand-ejector in order to permit of the cleaning of the different chambers of said trap. These objects I attain in the manner hereinafter set forth, reference being had to the accompanying drawings, in which—

Figure 1 represents sufficient of a locomotive-engine to illustrate the application thereto of that form of my invention which I denominate a "triple sander." Fig. 2 is a diagrammatic representation of the pipe system of said sander, this view showing in one part a section through the nozzle-chambers of the triple ejector and in another part a section through the supply-pipes above said triple ejector. Fig. 3 is an enlarged vertical section of one of the nozzle structures of the ejector. Fig. 4 is an inverted plan view of the same, partly in section. Fig. 5 is a view, partly in side elevation and partly in section, of the stand-pipes, coupling-head, and ejector structure of the triple sander. Fig. 6 is a sectional plan view of the same on the line *a a*, Fig. 5. Fig. 7 is a transverse section on the line *b b*, Fig. 5. Fig. 8 is a side elevation of the stand-pipes, coupling-heads, and ejector structure of a double sander constructed in accordance

with my invention. Fig. 9 is a plan or top view of the ejector structure of the same. Fig. 10 is a sectional plan view on the line *c c*, Fig. 8. Fig. 11 is a side elevation of the ejector structure of a single sander, and Fig. 12 is a longitudinal section of the same on the line *d d*.

Referring first to Figs. 1 and 2, the sand-box of the locomotive is represented at 1, and on each side of this sand-box is a projecting enlargement or boss 2, containing a sand-delivery passage, to which access can be had when desired by removing a screw-plug 3, which normally closes an opening in the top of said boss. Projecting from the boss is a pipe 4, which is coupled by any ordinary form of union 5 to a pipe 6, and the latter communicates with a multiple coupling-head 7, which receives the upper ends of a series of stand-pipes 8, 9, and 10, three of these stand-pipes being used in the triple sander which is shown in Fig. 1. The lower ends of these stand-pipes 8, 9, and 10 are united, by means, of suitable couplings, to a triple-ejector structure 11, preferably located below the running-board of the engine and containing three independent chambers or passages 8<sup>a</sup>, 9<sup>a</sup>, and 10<sup>a</sup>, as shown in Figs. 5, 6, and 7. With the lower end of each of these chambers communicates an ejector and a sand discharge or delivery pipe, the latter pipes being numbered, respectively, 8<sup>b</sup>, 9<sup>b</sup>, and 10<sup>b</sup>. The pipe 8<sup>b</sup> delivers sand in front of the forward driver of the engine, the pipe 9<sup>b</sup> delivers sand in front of a driver behind the leader, in the present instance the third driver, and the pipe 10<sup>b</sup> delivers sand behind the rear driver.

The various ejectors are supplied with air through three pipes 8<sup>c</sup>, 9<sup>c</sup>, and 10<sup>c</sup>, the pipes 8<sup>c</sup> and 9<sup>c</sup> being coupled to a pipe 12, which has a valve 13 to be operated by the engineer, said pipe 12 being connected to the main air-supply pipe 14 at any convenient point. The pipe 10 also has a valve 15 to be operated by the engineer, and said pipe 10<sup>c</sup> is likewise in communication with the main air-supply pipe 14. In the pipes 8<sup>c</sup> and 9<sup>c</sup> are stop-cocks 16 and 17, as shown in Figs. 1 and 2, so that when the valve 13 is open air may be directed through either or both of these pipes, depending upon the adjustment of the stop-cocks 16



and 17. Hence sand can be delivered in front of either the forward driver or the third driver or in front of both, as desired, while the opening of the valve 15 in the pipe 10<sup>c</sup> will effect the delivery of sand behind the rear driver, as may be required when the engine is reversed or backing up. Each of the pipes 8<sup>c</sup>, 9<sup>c</sup>, and 10<sup>c</sup> supplies ejector structures on opposite sides of the engine, the branches of the pipes being carried across beneath the boiler. It will be evident that this idea of the multiple ejector may be extended so as to deliver sand in front of more than two drivers and in the rear of more than one, if desired.

The provision of the stand-pipes is of importance, since by this means a long column of sand is provided between the sand-box and the ejector-nozzle, and this entire column of sand must be displaced before air can be blown back into the sand-box or into any other delivery-pipe than the one intended. Hence a pressure of air equal to the resistance to displacement afforded by such long column of sand is always available when the sander is in operation for forcing sand through and from the delivery-pipe. Hence there is always a forcible projection of the sand directly to the point of contact between the wheel and rail and very little likelihood of the delivery of sand being prevented by obstructions in the delivery-pipe.

Each of the chambers 8<sup>a</sup>, 9<sup>a</sup>, and 10<sup>a</sup> of the ejector structure has at the bottom an opening closed by a screw-plug 18, so that ready access may be had to any of the chambers for the purpose of removing therefrom pebbles or particles of foreign matter which may accumulate therein and which are too large to be blown through the delivery-pipes. Before removing either of the plugs 18 the flow of the sand into the chambers of the ejector structure must be cut off, and this can be readily effected by removing the plug 3 and inserting a wad of waste or other suitable obstruction into the sand-delivery passage formed in the boss 2, thus cutting off the flow of sand to all three of the stand-pipes and permitting all three of the chambers in the ejector structure to be cleaned at one time, the wad of waste or other obstruction being removed and the plug 5 reinserted after such cleaning has been effected.

Each of the air-jet nozzles 20 has an adjustable jet-pipe 21, which in the present instance is made in the form of a threaded tube screwed into a threaded opening in that portion of the nozzle which projects into the ejector-chamber, so that by turning said jet-pipe its discharge end may be moved into any desired relation to the receiving end or mouth of the sand-delivery pipe and the amount of sand discharged in a given time by the ejector thereby readily regulated, it being understood that the farther the mouth of the jet-pipe is withdrawn from the entrance end of the delivery-pipe the greater will be the amount of

sand delivered. The jet-pipe can be secured in position after adjustment by tightening a jam-nut 22, adapted to the thread of the jet-pipe and bearing upon the end of the nozzle, as shown in Figs. 3 and 4.

One of the previous objections to pneumatic sanders of the class to which my invention relates has been that in case of the obstruction of one of the delivery-pipes of a pair, the air backed up under full pressure therein would when the main pressure-valve was closed flow backward and carry sand through the ejector-nozzle, thereby choking or obstructing the same or the passage or passages leading thereto. In order to overcome this objection, I now use, in combination with the nozzle, a check-valve 23, which is preferably adapted to a seat in the nozzle-casing, or it may be otherwise located, it being preferable, however, to locate it as closely as possible to the discharge end of the nozzle. The stem of this valve has a nut 24, between which and a bearing in the nozzle-casing is interposed a spiral spring 25, which tends to close the valve to its seat when there is no air-pressure upon it, but permits the valve to open when the air is turned on. Immediately upon the cutting off of the air to either nozzle therefore the check-valve will be closed and any backflow of air therethrough will be prevented. Consequently the objection above noted will be effectually overcome.

Between the nozzle 20 and the air-supply pipe for the same I interpose a casing 26, having at each end a screen 27, this casing containing passages 28 and 29, connected by a short transverse passage 30, of small diameter, the casing 26 having in line with said passage a screw-plug 31, which can be removed whenever it is desired to gain access to the passage for testing or cleaning purposes. A screen is thus provided to prevent air which is traveling in either direction through the casing 26 from carrying with it foreign particles of such size as would have a tendency to choke the passages 28, 29, and 30. The purpose of the contracted passage 30 is to equalize the supply of air to the nozzles 20 on opposite sides of the engine.

In Figs. 8, 9, and 10 I have illustrated my engine as applied to a duplex ejector having one nozzle for causing a flow of sand through a pipe 8<sup>b</sup>, leading to the forward driving-wheel of the engine, and another ejector for causing a flow of sand through a pipe 10<sup>b</sup>, leading to a point behind the rear wheel of the engine, and the stand-pipe idea may also be applied to single ejectors—such, for instance, as that shown in Figs. 11 and 12.

It will be noted on reference to Fig. 1 that each of the sand-delivery pipes extends upward for a short distance immediately adjacent to the injector-casing, the purpose of this construction being to trap the sand at the receiving end of each pipe, so as to prevent it from sifting out onto the track when the engine is running with the air cut off, and so,



also, as to prevent the accumulation of a large volume of sand in either of the horizontal pipes, which would have to be displaced by the air when it was first turned on and which might offer such an obstruction as to cause the air to blow back into the sand-box.

Having thus described my invention, I claim and desire to secure by Letters Patent—

1. The combination in a pneumatic track-sander for locomotives, of a multiple ejector, a series of stand-pipes having a single connection with the sand-box, and so disposed as to maintain a column of sand above each chamber of the ejector so as to prevent blowing back of air into the sand-box when either of the sand-delivery pipes is obstructed, substantially as specified.

2. The combination in a pneumatic track-sander for locomotives, of a multiple ejector having a series of chambers each with cleaning-opening therein, and a single sand-supply pipe having branches communicating with said chambers of the ejector, said single pipe having a plugged opening whereby it may be obstructed and the flow of sand to all of the ejector-chambers thus cut off when it is desired to clean either of the same, substantially as specified.

3. The combination in a pneumatic track-sander for locomotives, of a multiple ejector having delivery-pipes discharging in front of two or more of the driving-wheels, and in the rear of one or more of the driving-wheels, substantially as specified.

4. The combination in a pneumatic track-sander for locomotives, of an ejector having two chambers each with ejector-nozzle, and sand-delivery pipe, air-supply pipes for each of said nozzles, stop-cocks in each of said pipes, and a single valved connection whereby both of the pipes are placed in communication with the main air-supply pipe, substantially as specified.

5. The combination in a pneumatic track-sander for locomotives, of an ejector having three chambers each with ejector-nozzle and sand-delivery pipe, the pipes of two of the

chambers discharging in front of the driving-wheels of the engine, and that of the other chamber discharging in the rear of one of said wheels, two pipes for supplying air to the nozzles of the forward delivery-chambers, each of said pipes having a stop-cock and both communicating through a single valved pipe with the main air-pipe, and an air-supply pipe for the nozzle of the third ejector-chamber, said pipe being independently valved, substantially as specified.

6. The combination in a pneumatic track-sander for locomotives, of an ejector structure communicating with the sand-box and having an air-jet nozzle and a sand-delivery pipe, and a check-valve located in the air-pipe behind the nozzle for preventing back-flow of air and sand through the nozzle, said check-valve being provided with means for restricting its approach toward the nozzle, substantially as specified.

7. The combination in a pneumatic track-sander for locomotives, of an ejector structure having an air-jet nozzle and sand-delivery pipe, with a structure interposed between the nozzle and the air-supply pipe therefor and having contracted passages separated by screens from the air-supply pipe and nozzle, substantially as specified.

8. The combination in a pneumatic track-sander for locomotives, of a sand-delivery pipe having a horizontal run and downwardly-bent discharging end, with the ejector located below the sand-box so as to interpose a column of sand between the two, said ejector having its discharge-nozzle slightly below the horizontal run of the delivery-pipe whereby the latter must be bent downward when it approaches the ejector-casing so as to form a trap adjacent to said casing, substantially as specified.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HENRY L. LEACH.

Witnesses:

MARY E. LEACH,  
GRACE LAMSON.