

G. D. FITZSIMMONS.

BLOWPIPE.

APPLICATION FILED MAR. 15, 1909.

Patented Sept. 21, 1909.

2 SHEETS—SHEET 1.

934,514.

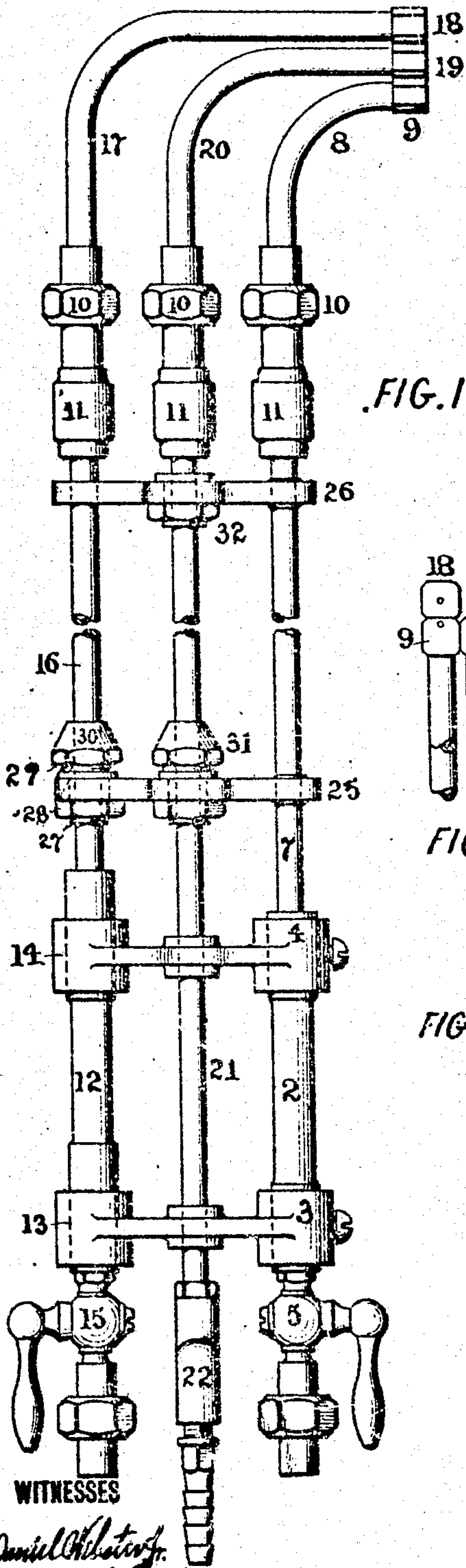


FIG. 1

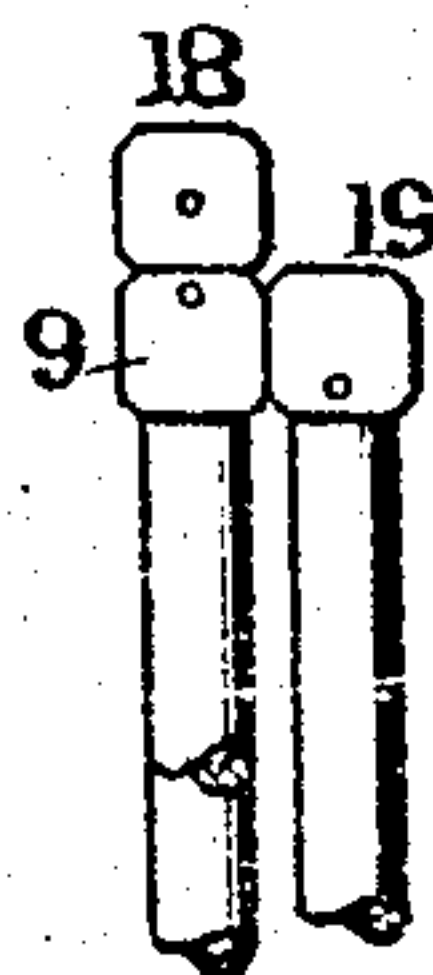


FIG. 3

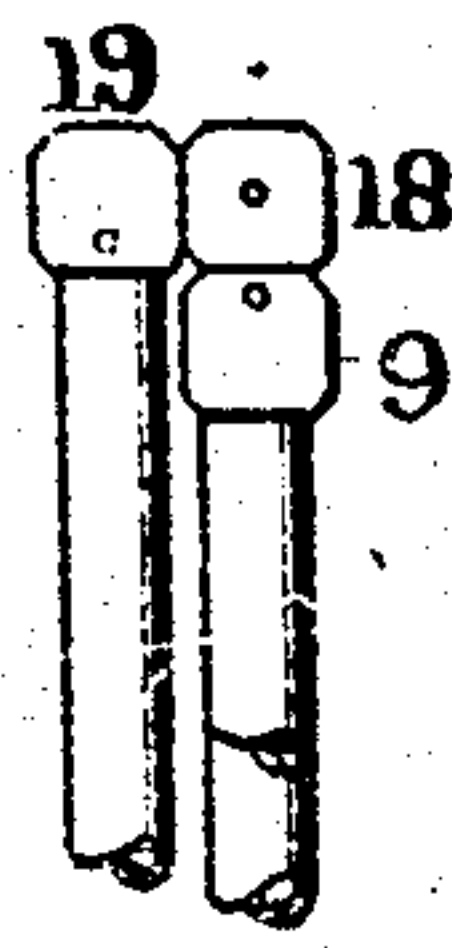


FIG. 4

FIG. 5

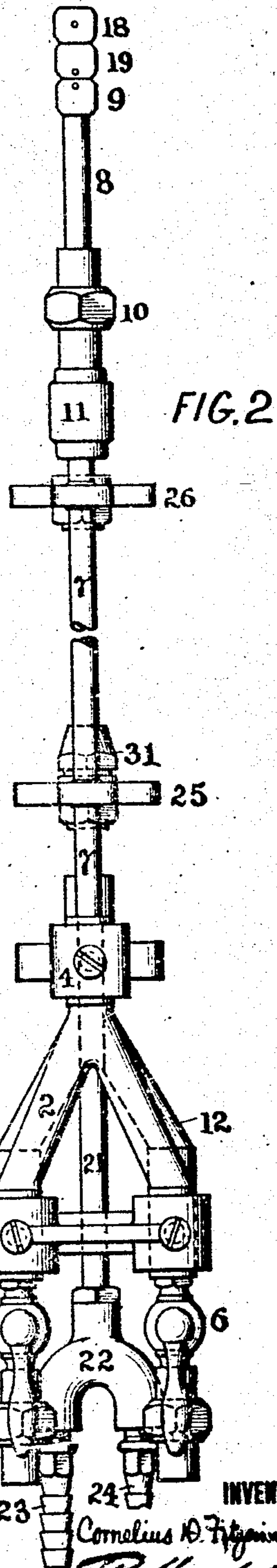
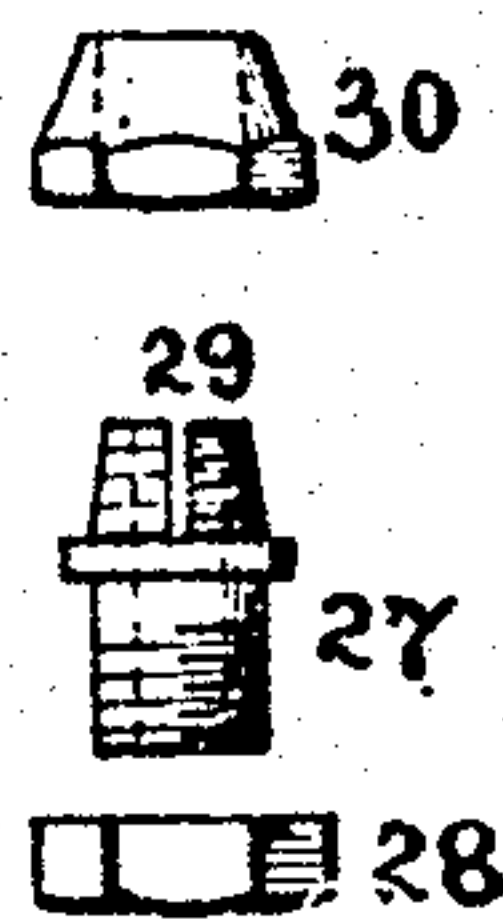


FIG. 2

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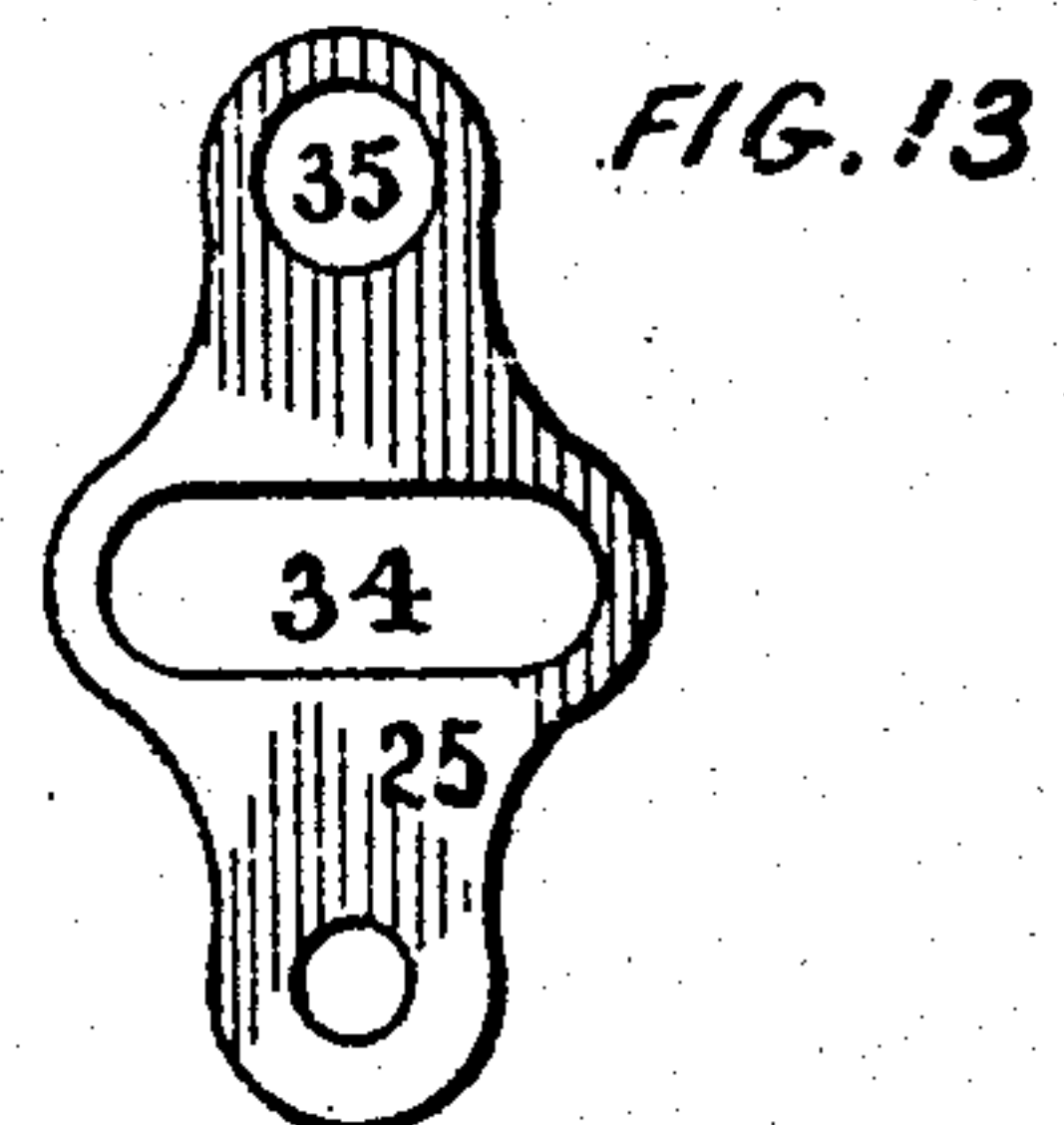
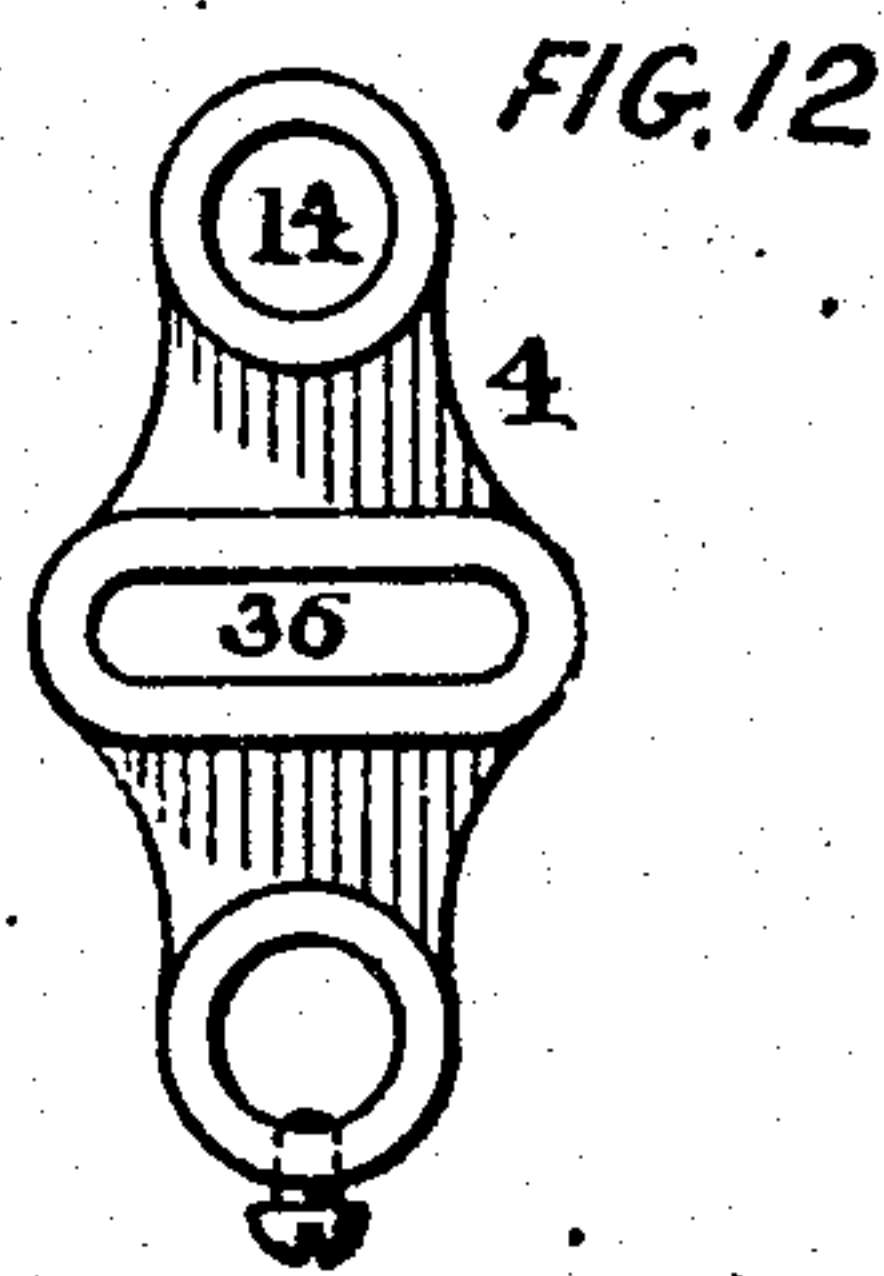
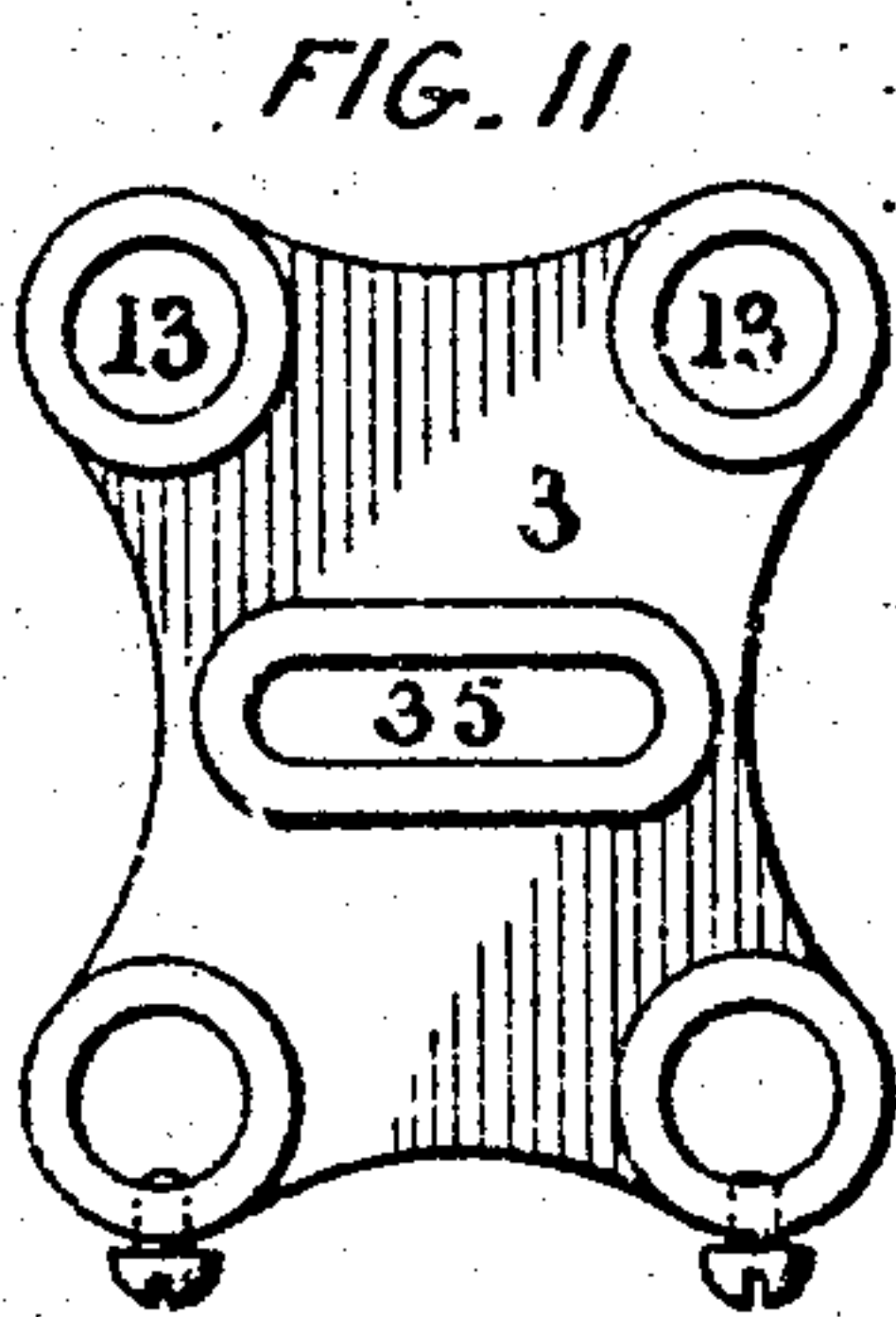
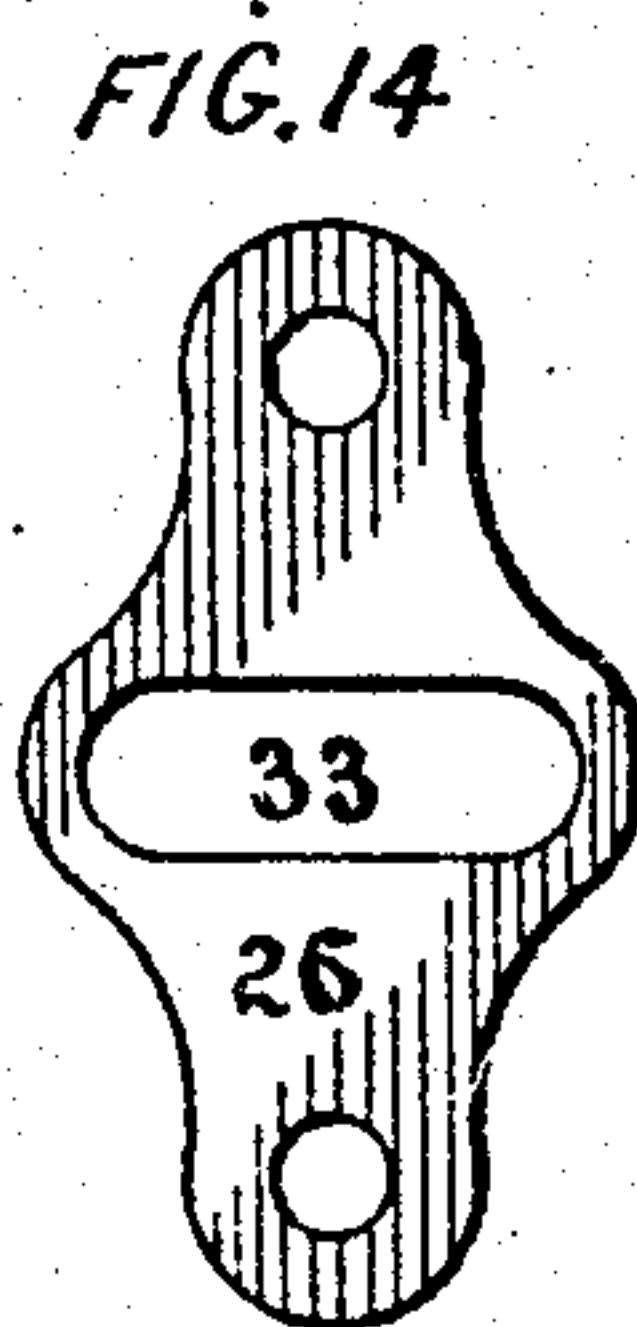
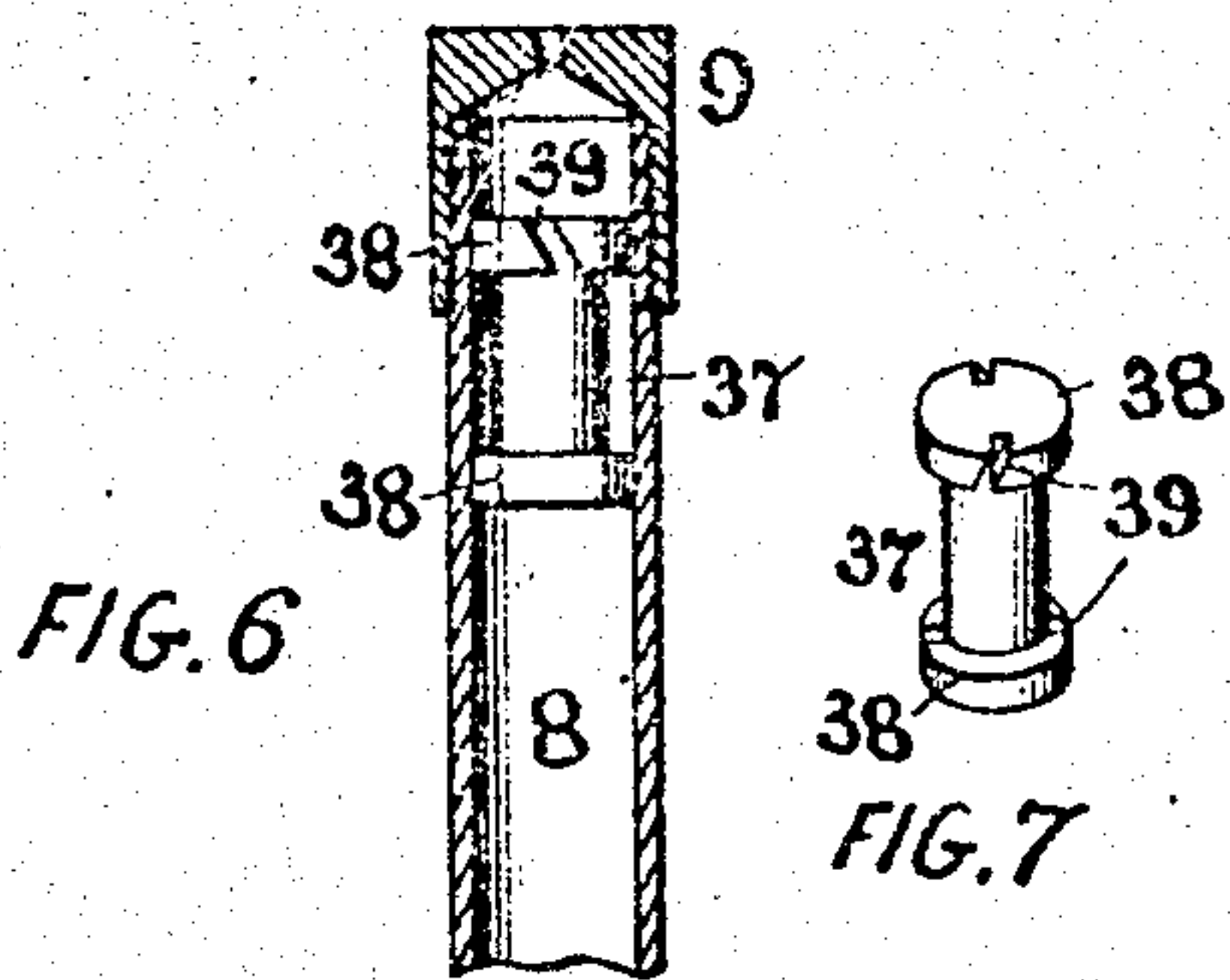
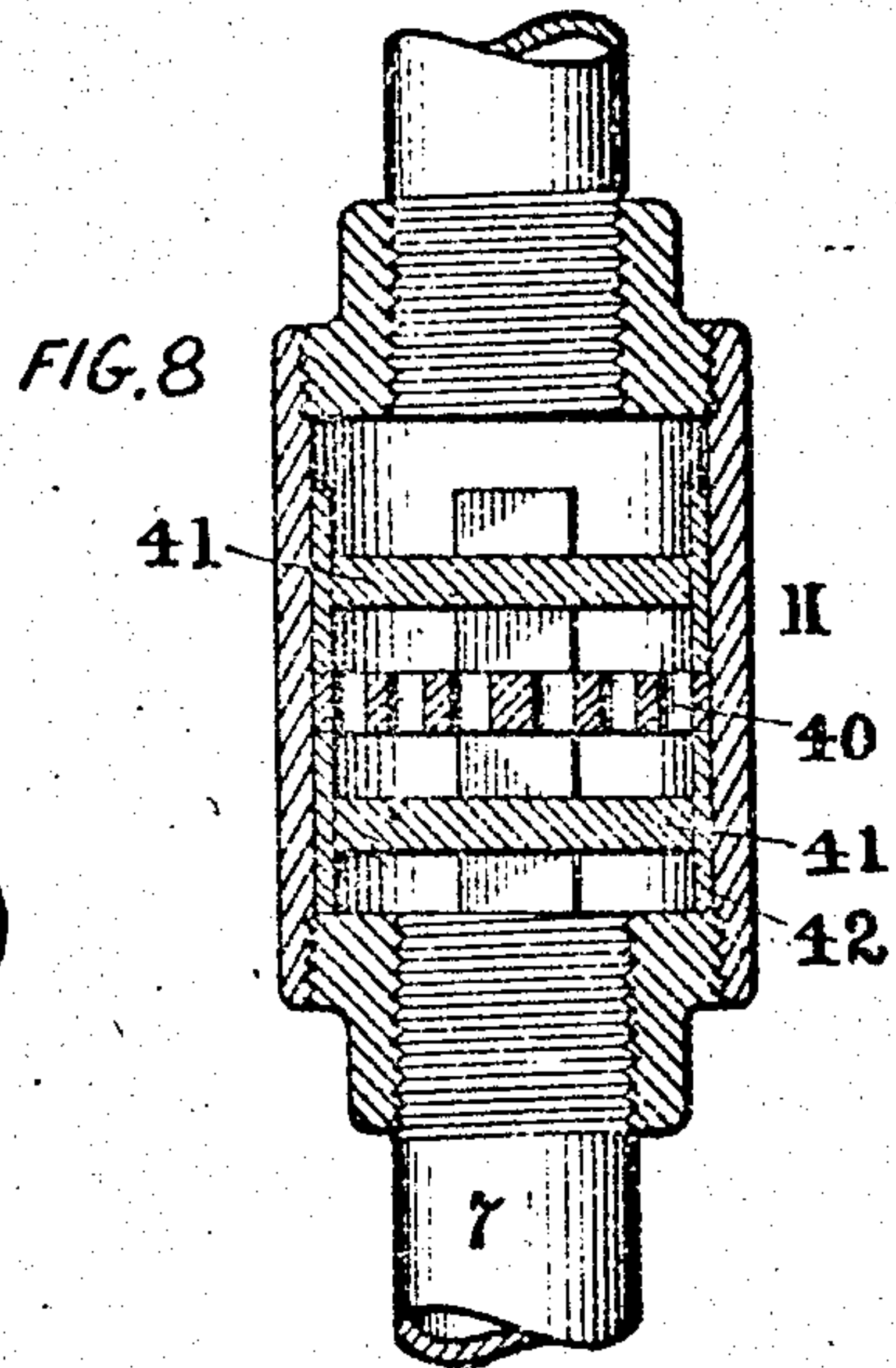
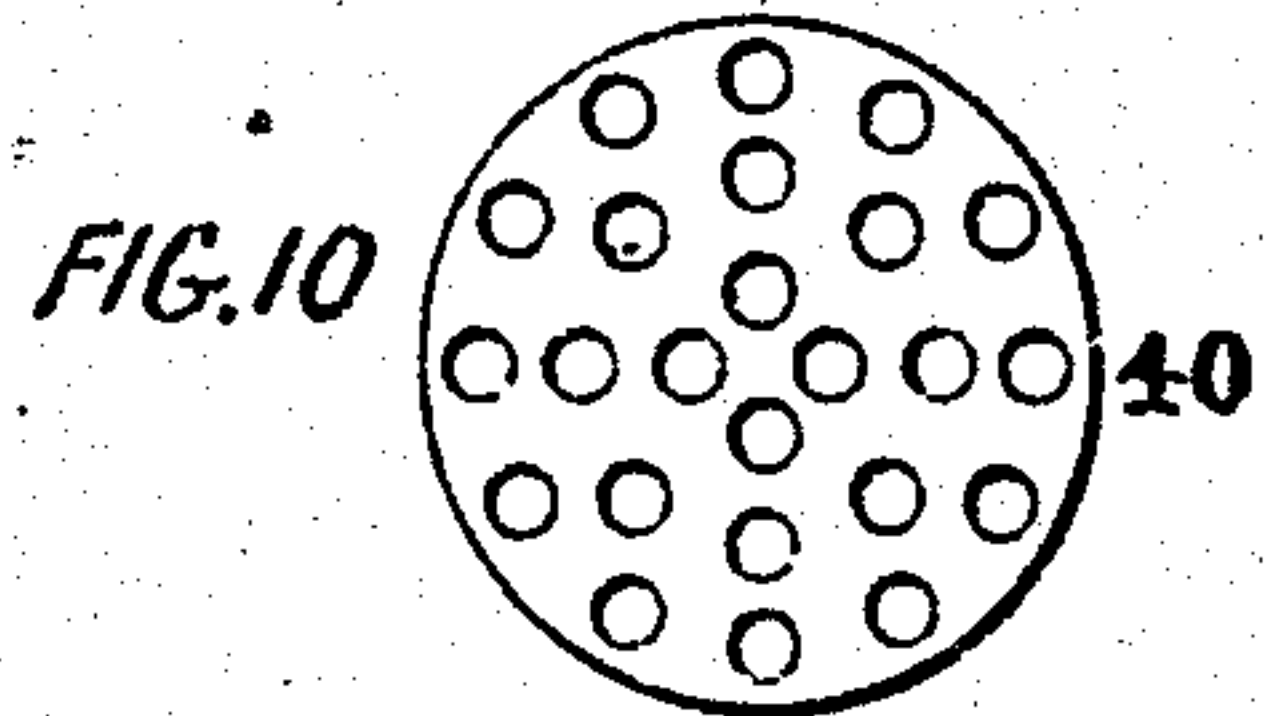
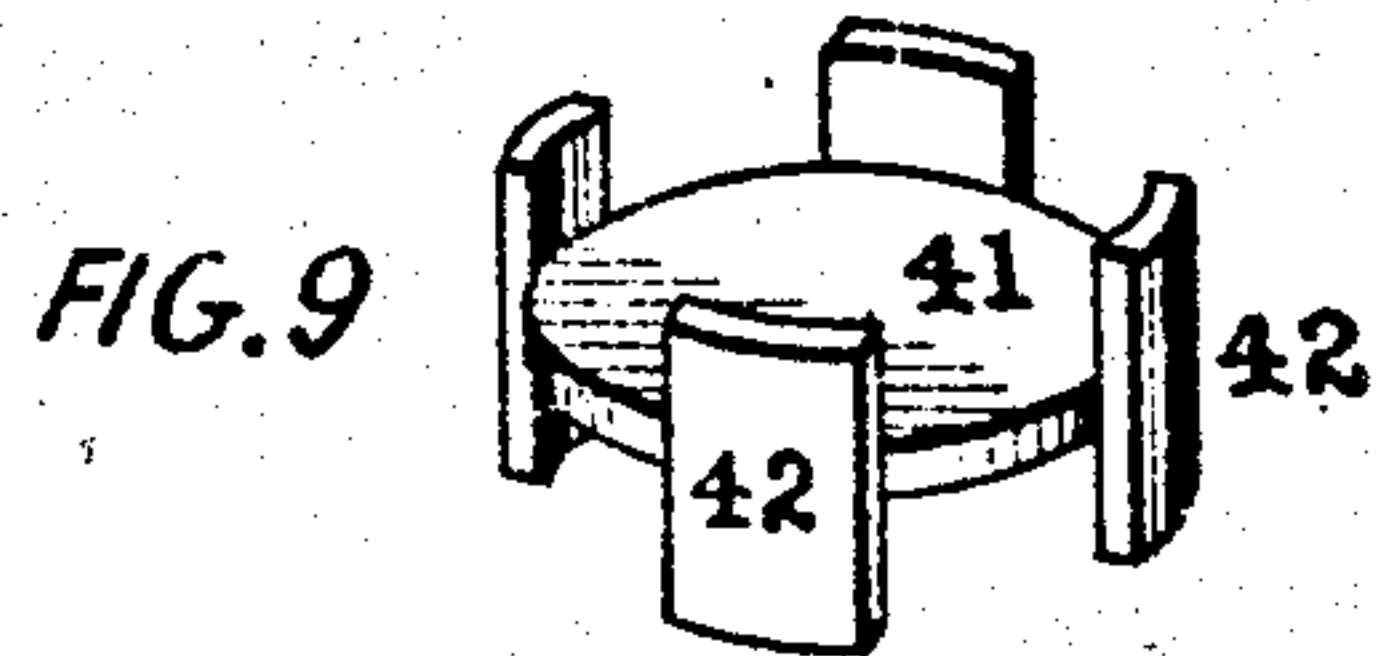
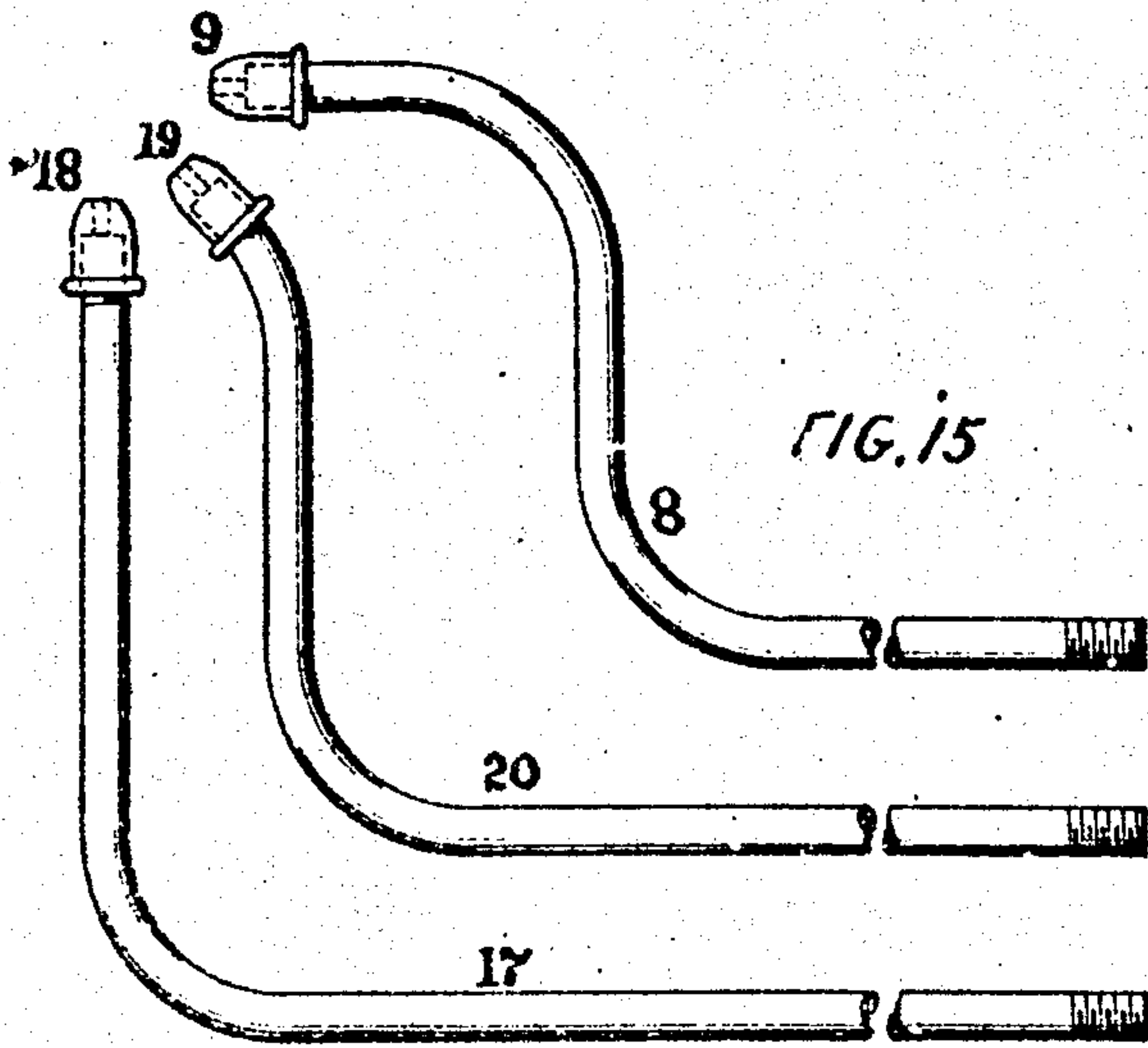
BY

INVENTOR  
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WITNESSES

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BY

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# UNITED STATES PATENT OFFICE.

CORNELIUS D. FITZSIMMONS, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO  
INTERCHANGEABLE BLOW PIPE AND METAL COMPANY, A CORPORATION OF PENN-  
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## BLOWPIPE.

934,514.

Specification of Letters Patent. Patented Sept. 21, 1909.

Application filed March 15, 1909. Serial No. 483,441.

*To all whom it may concern:*

Be it known that I, CORNELIUS D. FITZSIMMONS, a citizen of the United States, and resident of the city and county of Philadelphia, State of Pennsylvania, have invented an Improvement in Blowpipes, of which the following is a specification.

My invention has reference to blow pipes and consists of certain improvements which are fully set forth in the following specification and shown in the accompanying drawings which form a part thereof.

The object of my invention is to provide a construction of blow pipe which shall embody in its structure the following advantages:—First, it shall have capacity for having its nozzles interchangeable to adapt the direction and shape of nozzle to suit the character of work to be done; second, it shall be provided with a plurality of nozzles which have capacity for relative adjustment whereby the nozzles proper may be grouped in various ways to suit varying positions in which the blow pipe as a whole must be held for certain classes of work; third, the blow pipe is provided with a plurality of nozzles and combined with supply pipes and nozzles whereby different gas combinations may be caused to issue from or commingle immediately beyond the nozzles; fourth, one or more of the nozzles and their supply pipes may be provided with a plurality of supply nipples and with means for mixing the gases supplied by the nipples before issuing from the nozzles; fifth, the provision in the supply pipes of pressure regulating means whereby a substantially constant pressure may be maintained; sixth, the blow pipe as a whole is so constructed as to be readily dismantled for repairs and adapted for adjustment of its several parts relatively to each other.

By the employment of my improved blow pipe, I am enabled to produce flames of various shapes and intensities such as are suitable for brazing, fusing, and subdividing sheet metal and which flames may be oxidizing or reducing in character as required.

My invention consists in various features of construction which are fully described hereinafter and more particularly recited in the claims: and my invention will be better understood by reference to the drawings, in which:

Figure 1 is a side elevation of a blow pipe embodying my invention; Fig. 2 is a front

elevation looking toward the blow pipe nozzles; Figs. 3 and 4 are front views of the nozzles in different positions of relative adjustment; Fig. 5 is a view of one of the adjusting clamps with the parts separated; Fig. 6 is a sectional elevation of one of the nozzles; Fig. 7 is a perspective view of one of the mixers removed from the nozzles; Fig. 8 is a sectional elevation of one of the combined mixers and pressure regulators; Figs. 9 and 10 are views of portions of the same; Figs. 11 to 14 inclusive are plan views of the several bracing and guiding plates; and Fig. 15 is a view showing a modified arrangement of the nozzles and their immediate supporting pipes.

2 is a Y or branch and formed of a casting having a single discharge and two independent supply ends respectively connected with valved nozzles 5 and 6 whereby regulated supplies of different gases, such as oxygen and hydrogen, may be delivered to the branch 2 and caused to unite at the discharge end. Connected with the discharge end of the branch 2 is a pipe 7, and said pipe connects with a nozzle pipe 8 through the media of a union 10 and, if desired, a combined mixer and pressure reducer 11. The nozzle pipe 8 is curved and terminates in the nozzle 9 which may consist of a cap having a small aperture in its end. Within the end of the pipe 8 and just back of the nozzle 9 I prefer to provide a mixer plug 37 having one or more annular flanges 38 provided with oblique slots 39. If two flanges 38 are employed, as shown in Figs. 6 and 7, the slots in one flange are preferably out of alignment with the slots in the other flange. This form of mixer not only insures a very thorough mixing of the two gases employed, but also imparts to the mixture a rotary motion which insures a more satisfactory flame from the nozzle.

The combined mixer and pressure reducer 11 consists of a cylindrical body in which are arranged two baffle diaphragms 41 with an interposed perforated diaphragm 40, the holes being proportioned to suit the amount of resistance required. The baffle diaphragms 41 are of somewhat less diameter than the interior diameter of the cylindrical body and are provided at their edges with spacing and guiding flanges 42, which flanges hold the several diaphragms apart and from the ends of the cylindrical body,



and at the same time, permit the gases to flow around the edges of the diaphragms 41 and between them and the inner walls of the body 11. This mixer and pressure reducer may be of any other suitable construction if so desired or may be omitted altogether. When used in conjunction with the mixer 37 in the pipe 8 near the nozzle 9 it acts to mix the gases from the nipples 5 and 6 to a greater or less extent and the completing or the mixing operation is performed by the mixer 37 immediately before the gases are burned at the nozzle.

The blow pipe which I have described above may be used separate for employment of two gases such as oxygen and hydrogen gases, air and hydrocarbon or other gas, or acetylene gas and air. The nozzle pipe 8 and nozzle may be changed by using in place of that shown either one of the pipes and nozzles 8, 20 or 17 shown in Fig. 15 or any other suitably shaped nozzle pipe to suit the character of work to be performed. The nozzle and its pipe may thus be interchangeable and this is the simplest example of the interchangeableness of the blow pipe as a whole.

In the more extended structure of my invention, I provide a second set of parts corresponding in all material particulars to those above described except that they are preferably somewhat lengthened and the nozzle tube extends so that the nozzle thereof may come above and close to the nozzle 9. Referring to this addition, 12 is a branch tubular frame having valved nozzles 15 corresponding to nipples 5 and 6 of branch tubular frame 2. The discharge end of the branch tubular frame 12 connects with the tube 16 having at its top the mixer and pressure reducer 11 and the union 10. The nozzle tube 17 is secured to the union 10 and is bent over and its free end fitted with the nozzle 18 corresponding to nozzle 9 and immediately in lateral alignment with it. A mixing device 37 may be employed in the pipe 17 just back of the nozzle as in the case of pipe 8. The branch tubular frame 12 is somewhat longer than the corresponding branch frame 2 and is adjustable in bearings 13 of yoke 3 and bearing 14 of yoke 4, which yokes are rigidly secured to the branch frame 2. Secured to the tube 7 are the yokes 25 and 26 and these also connect with and guide the tube 16 from the branch tubular frame 12. The hole 35 in the yoke 25 receives the body 27 of a chuck which is clamped to the yoke by nut 28 and surrounds the pipe 16. A clamping nut 30 screws down upon the split tapered jaw 29 of the chuck and causes the jaw to clamp the tube 16 so as to hold it in any adjusted position. By means of this adjustment the nozzle 18 may be adjusted to or from the nozzle 9 as indicated in Figs. 2, 3 and 4.

It is evident that any other manner of adjusting and clamping the parts in adjusted position may be employed in lieu of that shown. This additional nozzle 18 and its appendages may be employed to project the same gases as the nozzle 9 or different gases as may be desired, whereby it may be used to increase the size of the flame or to intensify it or change its chemical qualities according to the gases employed.

In addition to the combination blow pipes above described, I provide in practice a third blow pipe of somewhat modified construction, as follows:—A pipe 21 is arranged between the pipes 7 and 16 and extends upward through elongated slots 35 and 36 respectively in the yokes 3 and 4, elongated slot 34 in yoke 25 and elongated slot 33 in yoke 26. The slots 33 and 34 are wider than the pipe and receive the means to guide and clamp the pipe 21 in its adjusted positions. The slot 33 is provided with an adjustable guide 32 which may be adjusted laterally and clamped in position without clamping the tube 21. The slot 34 is provided with a clamping guide or chuck 31 (similar to parts shown in Fig. 5) for guiding and clamping the tube 21, and said chuck is adjustable laterally in the slot. The bottom of the pipe 21 is connected with means for supplying it with a gas and, as shown, said means is a branch 22 having nipples 23 and 24 for supplying two gases. The upper end of the pipe 21 is provided with the mixing and pressure reducing device 11 and the union 10, and secured to the union is the curved nozzle pipe 20 carrying the nozzle 19 and arranged close to the nozzles 9 and 18. This pipe 20 may also have a mixing bushing 37 back of the nozzle 19 as provided in pipes 8 and 17, if so desired.

It will be evident that by loosening the chuck 31 the nozzle 19 may be adjusted laterally with respect to the nozzle 9 and if the guide 32 is also loosened and these parts 31 and 32 be shifted sidewise, then the nozzle 19 may be brought to the positions shown in Figs. 3 and 4 and again clamped fixedly in position. It will be understood that while the nozzle 19 has capacity for both vertical and lateral adjustment (Figs. 3 and 4), nozzle 18 has capacity for vertical adjustment alone to assume either of the positions of Figs. 2, 3 and 4. It will also be understood that this nozzle 19 is adapted for supplying the same or different gases as the nozzles 9 or 18, for if the same gases were employed the adjustment of the nozzle 19 relatively to the nozzles 9 and 18 enables various shapes of flames to be produced to suit the character of work to be performed.

While I have shown the mixing and pressure reducers 11 on each of the three pipes 7, 16 and 21 they may be omitted from either or all of said pipes if so desired; and like-



wise, the mixing bushings 37 may be omitted from either or all of the pipes 8, 17 or 20.

My improved interchangeable blow pipe is adapted for various kinds of work by producing different kinds and shapes of flames, and it is a most important part of the invention that the nozzles are adjustable as to relative positions and also that the nozzle pipes are replaceable by others when necessary to reach the place in the work to be operated upon. Instead of the nozzles and nozzle pipes shown in Fig. 1, I may employ other forms of pipes, as shown for example in Fig. 15. In the preferred form of nozzle, I make the body with flattened sides so that they may be adjusted close up to each other to bring the jets as close together as possible. It is also seen that the several pipes 8, 17 and 20 are each of a different length and bend so as to reach from different distances and bring the nozzles close together; and it is evident that if the unions were not employed these pipes could be removed in the order 17, 20 and 8 or inserted in the reverse order by simply screwing them in place in suitable coupling sleeves or sockets carried at the tops of the pipes 16, 21 and 7.

The nozzles 9 and 19 and their appendages may be used together or said nozzle 19 with its appendages may be employed with nozzle 18 and its appendages, or it may be omitted altogether if so desired.

I have shown my blow pipe structure in its most complete form and hence while I prefer to construct it as here shown, I do not restrict myself thereto as it may be modified in the particulars above enumerated and the details likewise may be modified without departing from the spirit of the invention.

Having now described my invention what I claim as new and desire to secure by Letters Patent, is:

1. A blow pipe consisting of a branching tubular frame for receiving separate gases and mixing them, combined with a single body pipe leading from the branching tubular frame, a detachable curved nozzle pipe supported by the body pipe and having its end directed laterally away from the axis of the said body pipe, and a nozzle secured upon the end of the nozzle pipe.

2. A blow pipe consisting of a branching tubular frame for receiving separate gases and mixing them, combined with a body pipe leading from the branching tubular frame, a detachable curved nozzle pipe, a nozzle secured upon the end of the nozzle pipe having its aperture directed away from the axis of the body pipe connecting the branching tubular frame and the nozzle pipe, and a mixer device arranged within the nozzle pipe close to the nozzle.

3. A blow pipe consisting of a branching tubular frame for receiving separate gases and mixing them, combined with a body pipe

leading from the branching tubular frame, a detachable curved nozzle pipe, a nozzle secured upon the end of the nozzle pipe having its aperture directed away from the axis of the body pipe connecting the branching tubular frame and the nozzle pipe, and a mixer device arranged within the nozzle pipe close to the nozzle consisting of a flanged bushing having diagonal slots in its flanges for imparting to the mixed gases a rotary motion before escaping from the nozzle.

4. A blow pipe consisting of a branching tubular frame for receiving separate gases and mixing them, combined with a body pipe leading from the branching tubular frame, a detachable curved nozzle pipe, a nozzle secured upon the end of the nozzle pipe having its aperture directed away from the axis of the body pipe connecting the branching tubular frame and the nozzle pipe, and a mixer device arranged within the nozzle pipe close to the nozzle consisting of a body 37 having its ends provided with flanges 38 having notches 39 and in which the notches of one flange are arranged out of alignment with the notches of the other flange.

5. A blow pipe consisting of a branching tubular frame for receiving separate gases and mixing them, combined with a body pipe leading from the branching tubular frame, a detachable curved nozzle pipe, a nozzle secured upon the end of the nozzle pipe having its aperture directed away from the axis of the body pipe connecting the branching tubular frame and the nozzle pipe, a mixer device arranged within the nozzle pipe close to the nozzle, and a combined mixer and pressure reducing device arranged in the body pipe between the nozzle pipe and the branching tubular frame.

6. A blow pipe consisting of a branching tubular frame for receiving separate gases and mixing them, combined with a body pipe leading from the branching tubular frame, a detachable curved nozzle pipe, a nozzle secured upon the end of the nozzle pipe having its aperture directed away from the axis of the body pipe connecting the branching tubular frame and the nozzle pipe, a mixer device arranged within the nozzle pipe close to the nozzle, and a combined mixer and pressure reducing device arranged in the body pipe between the nozzle pipe and the branching tubular frame and consisting of a cylindrical body 11, a perforated diaphragm 40 therein and baffle diaphragms 41 upon opposite sides of the perforated diaphragm arranged so as to be somewhat separated from the perforated diaphragm.

7. A blow pipe consisting of a branching tubular frame for receiving separate gases and mixing them, combined with a body pipe leading from the branching tubular frame, a detachable curved nozzle pipe, a nozzle se-



secured upon the end of the nozzle pipe having its aperture directed away from the axis of the body pipe, and a mixing and pressure reducing device consisting of a cylindrical body 11, a perforated diaphragm 40 therein and baffle diaphragms 41 upon opposite sides of the perforated diaphragm arranged so as to be somewhat separated from the perforated diaphragm.

8. A blow pipe structure consisting of a branching tubular frame for receiving separate gases and mixing them, a body pipe leading from the branching tubular frame, a detachable curved nozzle pipe, a nozzle secured upon the end of the nozzle pipe having its aperture directed away from the axis of the body pipe, combined with a second blow pipe structure corresponding in all material respects with the first mentioned blow pipe structure but in which the nozzle pipe is longer to bring its nozzle immediately adjacent to the nozzle of the first mentioned blow pipe structure, and connecting means between the two blow pipe structures for holding them in alinement.

9. A blow pipe structure consisting of a branching tubular frame for receiving separate gases and mixing them, a body pipe leading from the branching tubular frame, a detachable curved nozzle pipe, a nozzle secured upon the end of the nozzle pipe having its aperture directed away from the axis of the body pipe, combined with a second blow pipe structure corresponding in all material respects with the first mentioned blow pipe structure but in which the nozzle pipe is longer to bring its nozzle immediately adjacent to the nozzle of the first mentioned blow pipe structure, connecting means between the two blow pipe structures for holding them in alinement, and means for adjusting the two blow pipe structures relatively in the direction of their length whereby the nozzles thereof may be brought close together or separated to a distance apart.

10. A blow pipe structure consisting of a branching tubular frame for receiving separate gases and mixing them, a body pipe leading from the branching tubular frame, a detachable curved nozzle pipe, a nozzle secured upon the end of the nozzle pipe having its aperture directed away from the axis of the body pipe, in combination with a second blow pipe structure comprising a longitudinal body pipe having at one end a detachable curved nozzle pipe, a nozzle on the end of said nozzle pipe arranged immediately adjacent to the nozzle of the first mentioned blow pipe structure, means for connecting the two blow pipe structures, and means for adjusting the two blow pipe structures relatively to each other whereby the nozzles may be adjusted to or from each other in the direction of the length of the blow pipe and also laterally with respect to

each other in a direction transversely to the length of the blow pipe whereby different combinations of the blow pipe nozzles may be had to suit the character of the work to be done.

11. In a blow pipe, the combination of three parallel body pipes mechanically connected together with capacity of relative adjustment one to the other, means for independently supplying gases to the several pipes, independent nozzle pipes extending respectively from the three parallel body pipes and terminating in nozzles arranged close together, and means to adjust and hold the parallel body pipes in relative adjustment whereby the nozzles may be either arranged in a straight row one above the other, or in various combinations in triangular, as desired, to suit the requirements of the work to be done.

12. In a blow pipe, the combination of a plurality of parallel body pipes, means for holding the said pipes in relative alinement, means for supplying gases to said pipes, a plurality of bent nozzle pipes extending respectively from the body pipes and all terminating at their free ends in substantially the same plane, and nozzles for said nozzle pipes, the construction being such that the said nozzles may be grouped closely together.

13. In a blow pipe, the combination of a plurality of parallel body pipes, means for holding the said pipes in relative alinement, means for supplying gases to said pipes, a plurality of bent nozzle pipes extending respectively from the body pipes and all terminating at their free ends in substantially the same plane, flat-sided nozzles for said nozzle pipes and means for adjusting the pipes relatively to each other, the construction being such that the said nozzles may be grouped closely together and in different relative positions.

14. A blow pipe consisting of a body pipe and branching tubular frames for supplying mixed gases to said body pipe, combined with a curved nozzle pipe, a nozzle upon the end of said curved nozzle pipe, and a detachable connection between the curved nozzle pipe and the body pipe whereby the nozzle pipe and its nozzle may be interchangeable.

15. In a combination blow pipe, two blow pipe structures each provided with a nozzle pipe but of different length and curved so as to have their free ends close together, combined with a frame secured to one of the blow pipe structures and having bearings in which the other blow pipe structures is longitudinally guided for adjustment, and means for securing the two blow pipe structures in fixed relative adjustment.

16. In a combination blow pipe, two blow pipe structures each provided with a nozzle pipe but of different length and curved so as



to have their free ends close together, combined with a frame secured to one of the blow pipe structures and having bearings in which the other blow pipe structure is longitudinally guided for adjustment, and means  
5 for securing the two blow pipe structures in fixed relative adjustment consisting of a yoke secured to one of the blow pipe structures and a friction chuck carried by said  
10 yoke and adapted to clamp the other of the blow pipe structures to hold it.

17. In a combination blow pipe three blow pipe structures having nozzles arranged in close juxtaposition, a series of yokes respectively secured to a blow pipe structure  
15

and each provided with holes for one of the other blow pipe structures and a slotted portion for the remaining blow pipe structure, and independent chucks for adjusting and clamping the adjustable blow pipe structures  
20 in rigid positions in the apertures and slots of the yokes, whereby various combinations of the blow pipe nozzles may be arranged to suit the requirements of the work to be done.

In testimony of which invention, I here-  
25 unto set my hand.

CORNELIUS D. FITZSIMMONS.

Witnesses:

R. M. HUNTER,

R. M. KELLY.