

No. 622,867.

Patented Apr. 11, 1899.

H. E. SHAFFER.  
ACETYLENE GAS BURNER.

(Application filed Aug. 16, 1898.)

(No Model.)

FIG. 1.

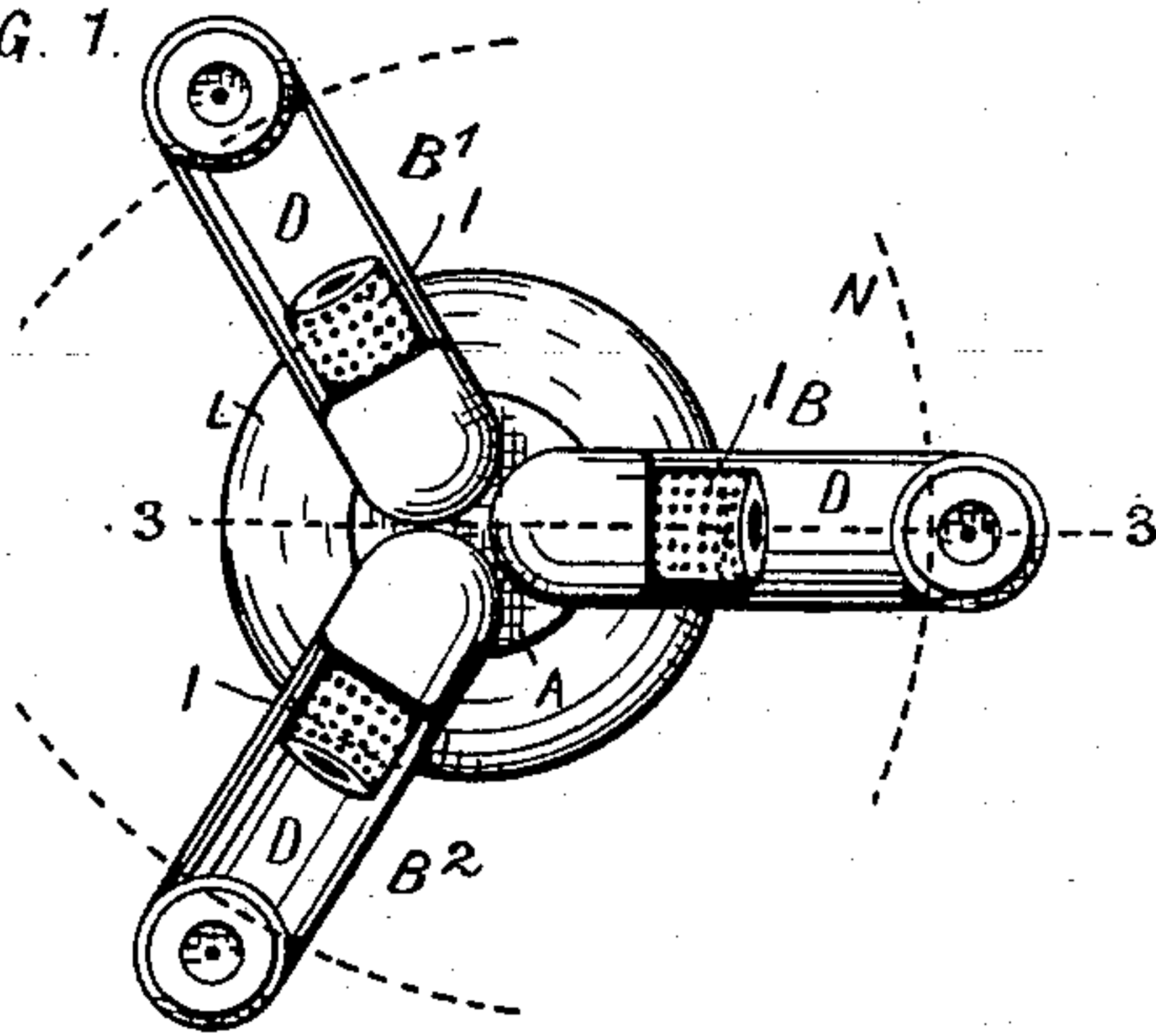


FIG. 3.

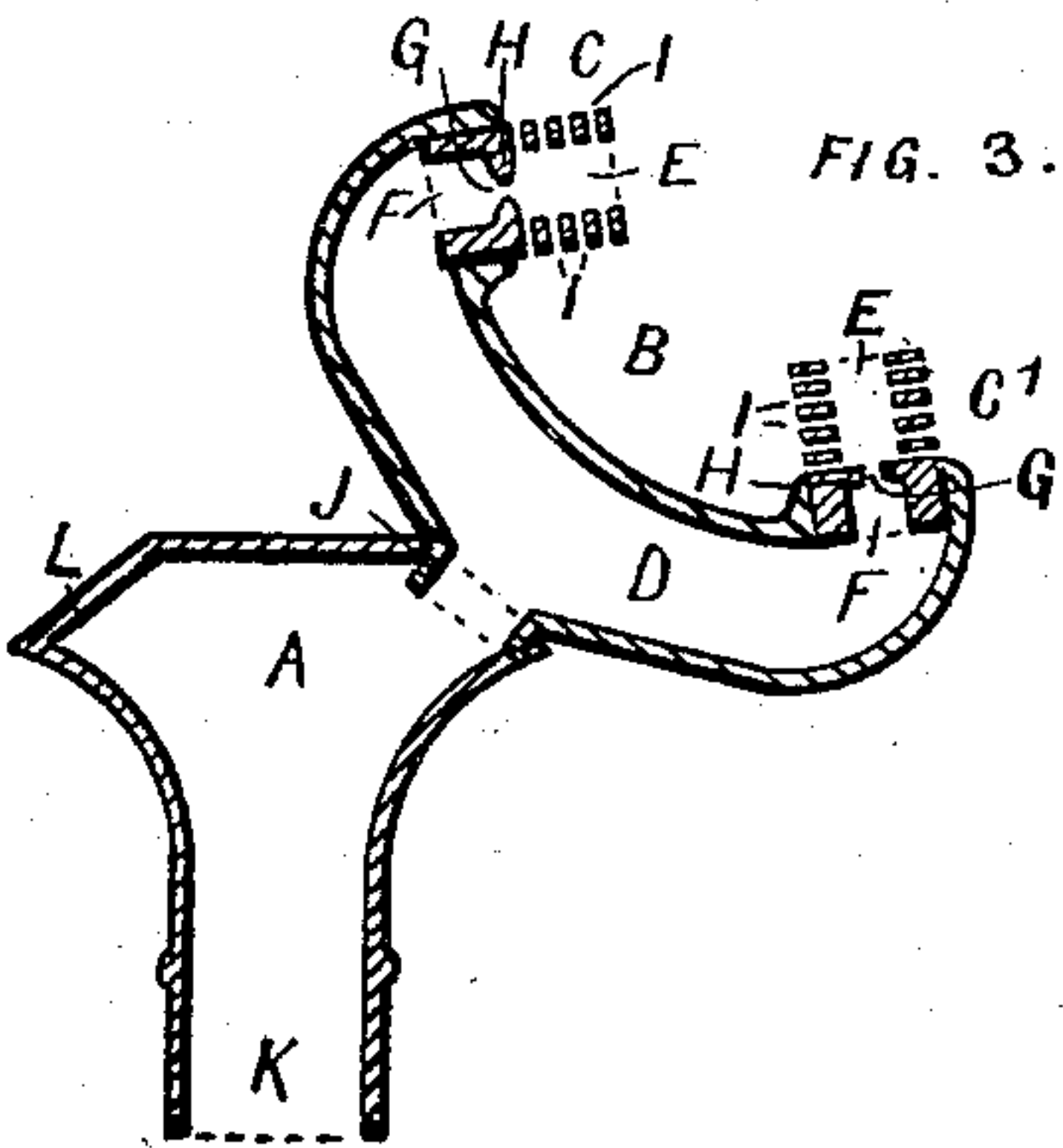


FIG. 2.

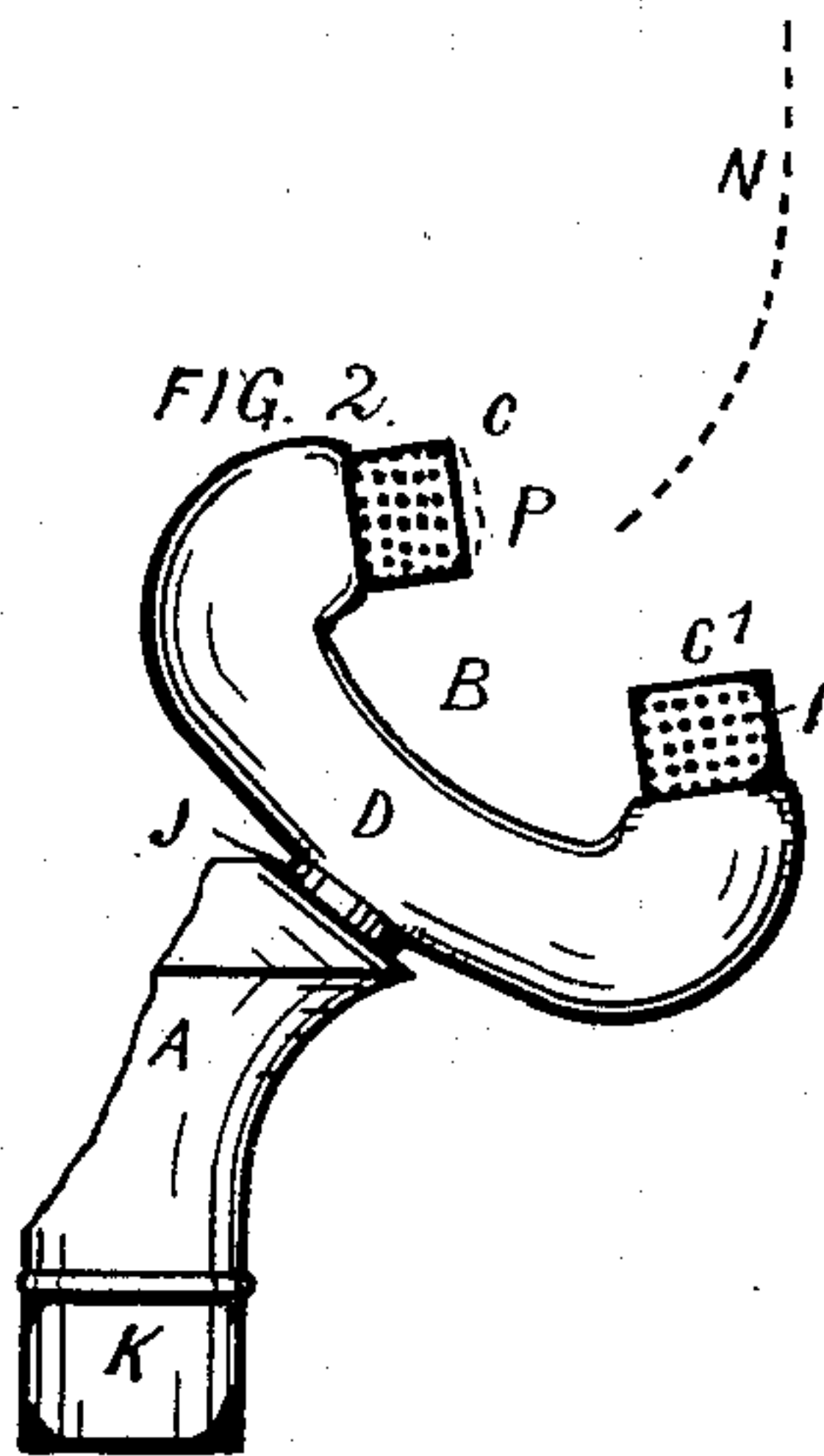
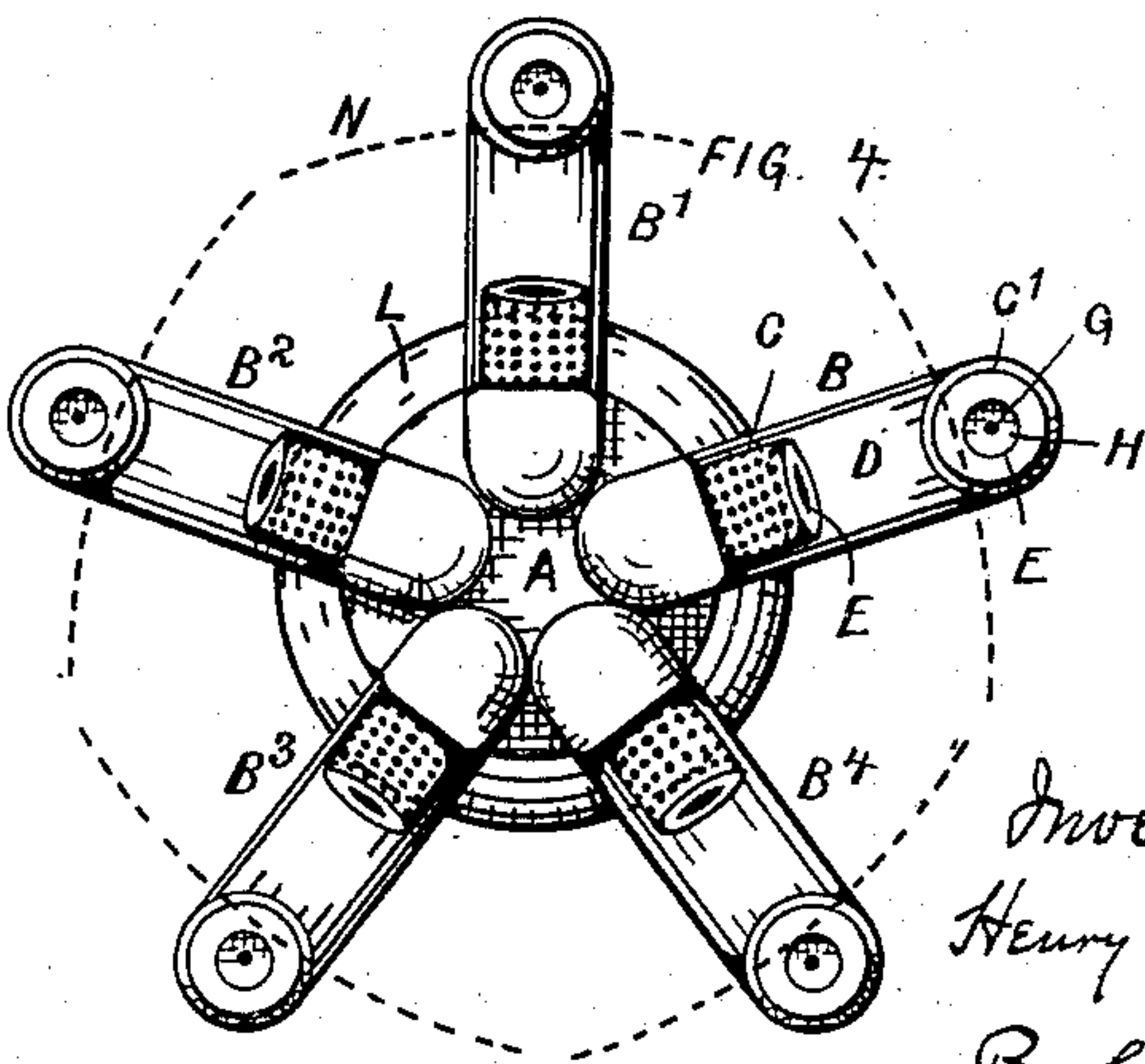


FIG. 4.



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# UNITED STATES PATENT OFFICE.

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## ACETYLENE-GAS BURNER.

SPECIFICATION forming part of Letters Patent No. 622,867, dated April 11, 1899.

Application filed August 16, 1898. Serial No. 688,715. (No model.)

*To all whom it may concern:*

Be it known that I, HENRY E. SHAFFER, a citizen of the United States, residing at Rochester, New York, have invented certain Improvements in Acetylene-Gas Burners, of which the following is a specification, reference being had to the accompanying drawings.

My present invention relates to improvements in burners for acetylene gas whereby the illuminating power is greatly increased.

These improvements of mine are fully described and illustrated in the following specification and the accompanying drawings, the novel features thereof being specified in the claims annexed to the said specification.

In the accompanying drawings, representing my present improvements in burners for acetylene gas, Figure 1 is a plan view. Fig. 2 is a partial side elevation. Fig. 3 is a section on the line 3 3, Fig. 1. Fig. 4 represents a modification designed to increase the amount of light.

In the accompanying drawings, representing my improved acetylene-gas burner, A is the central body or stem, which receives the gas from any suitable source and delivers it to the double-jet burners B B' B<sup>2</sup>. These burners each consist of the gas-delivery pipe, having passage D and the tips C C', which are of refractory material arranged in pairs.

J is a hollow stem which enters an opening in the inclined upper surface L of the body and supports the burner in place.

The jets C C' each consist of a cylinder of any suitable refractory material, having relatively large central passages E and F reaching inward from each end of it and communicating together at their inner ends by a restricted opening G in the wall H between the passages. The wall of the outer passage E is provided with a series of fine radial perforations I, which admit a large quantity of air to mix with the gas escaping from the orifice G. The perforations I are preferably arranged as close together as possible all around the cylinder and along the whole length of the outer central passage E. The two tips C and C' are set at an angle with each other and supported in that relation by the hollow passage D, being cemented or otherwise secured in its ends. The tips are preferably set at right angles with each other. The jets of

gas issuing from the passages E meet at a point some distance from the tips and unite to form a flame which burns in the position approximately indicated by the dotted lines N. The lower part of the flame curves outward, while its upper part is practically vertical, as indicated in Fig. 2. The double burner is inclined outward and downward from the vertical line, the best results, so far as the amount of light and the size of the burner are concerned, being attained with an angle of about thirty degrees. This angular arrangement gives the curved shape to the flame, as seen from the edge, and enables me to use a small body and one which does not throw an objectionable shadow, while securing a large amount of light.

In Fig. 1 I have represented a combination-burner having three double tips arranged at one hundred and eighty degrees apart, the position of the three flames produced by this construction being approximately indicated by the dotted lines N. In Fig. 4 I have shown a burner provided with five double tips and producing five of these flames, as indicated. The flames occupy such a relative position that each and every flame is reflected through and by each other flame in the combination on the burner, from which arises a considerable gain in the amount of the light from reflection alone. An open space is left between the flames, occupied only by free air, which rushes in from every direction into this open space, in which the air becomes highly heated, and thus a better combustion is produced. At the same time the tips are kept cool by the air passing over them from every direction, and any deposit on the tips is thereby prevented. The flames are arranged in an approximately circular form about the vertical axis of the body in consequence of the radial arrangement of the double jets and their delivery-tubes, and consequently the light thrown out is equal in every direction. The tips or burners of each pair are arranged in the same vertical plane one above the other, substantially as indicated, and the pipe D is bent in vertical plane and attached obliquely to the body, this arrangement of the pipes being adapted to provide for the use of a large number of double burners around the body without undue interference and the particu-



lar arrangement of tips being adapted to produce a series of flat flames flaring upwardly and outwardly around the central line of the body.

5 I am aware that individual burner-tips each supported by a separate pipe or tube and inclined outwardly from a central gas-supply conduit are known, and such device is not claimed, but the improvement hereinafter  
10 pointed out.

The essential feature of this tip is that it supplies air to the gas at the point where the gas makes its entrance into the larger open channel from the restricted orifice G all  
15 around and from every side by the perforations through the walls. These open perforations are placed all around the cylinder and throughout the whole length of the outer passage, so that fresh air is added to the gas and  
20 also to the mixture of air and gas throughout the whole journey through the channel on its way out to the open air, where the combustion takes place on combination with more air. These small air-perforations are made  
25 very numerous, and their number may be only limited by the necessity of leaving stock enough to hold the tip together. The perforations are arranged in parallel rows or alternately or otherwise, as may be preferred.  
30 The outer end of the tip may be beveled, as indicated at P, Fig. 2. It will be understood that the orifice G might be made at the inner end of the cylinder; but in this case the jet effect of the escaping gas is reduced, and if  
35 the small orifice G be prolonged the escape of the gas is retarded by increased friction.

I claim—

1. The herein-described burner-tip, consisting of a cylinder of refractory material having a thin wall, a relatively large central cylindrical passage reaching inward from each  
40 end of the cylinder, a restricted opening between the inner ends of the passages, and numerous fine radial perforations in the wall of the outer passage throughout the length of  
45 the same, substantially as described.

2. The combination with the burner-tips, arranged at an angle with each other, consisting each of a cylinder of refractory material having relatively large passage one in  
50

each end communicating with each other through a restricted opening, with a series of numerous fine radial perforations in the wall of the outer passage throughout the length of the same, and the gas-delivery pipe supplying both jets and sustaining them in their proper relative position, substantially as described. 55

3. The combination with the central body, of the herein-described double-jet burner attached to the body at an angle with the vertical, and consisting of a pair of refractory cylindrical tips having each a thin wall and passages at each end connected by a restricted opening, and having numerous fine radial perforations through the walls of the outer passages and at right angles thereto, and the gas-delivering pipes having each a passage communicating with a pair of tips and secured to the body, substantially as described. 60 65 70

4. The combination with the central body containing a gas-reservoir, of pairs of radially-arranged jet-burners, and bent delivery-pipes, said pipes being connected directly to the body and obliquely thereto and each provided with a pair of gas-burners the members of which are inclined to each other, whereby there is produced a series of flat flames arranged in approximately circular form about the vertical axis of the body, substantially as described. 75 80

5. The herein-described acetylene-burner tip, consisting of a cylinder of refractory material provided with a central passage open at its outer end and receiving gas through a restricted orifice at its inner end, and having its wall provided throughout its length with numerous fine radial perforations at right angles to the passage, substantially as described. 85

6. In a gas-burner, a body containing a gas-receptacle, a plurality of gas-pipes each arranged obliquely with respect to the body and provided with a pair of coacting tips, said tips of each pair being situated in the same vertical plane and in different horizontal planes, substantially as described. 90 95

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Witnesses:

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