L. H. BRINKMAN.

ANNULAR BURNER.

APPLICATION FILED NOV. 23, 1904.

911,373. **Patented Feb. 2, 1909.**

Fig. 1.

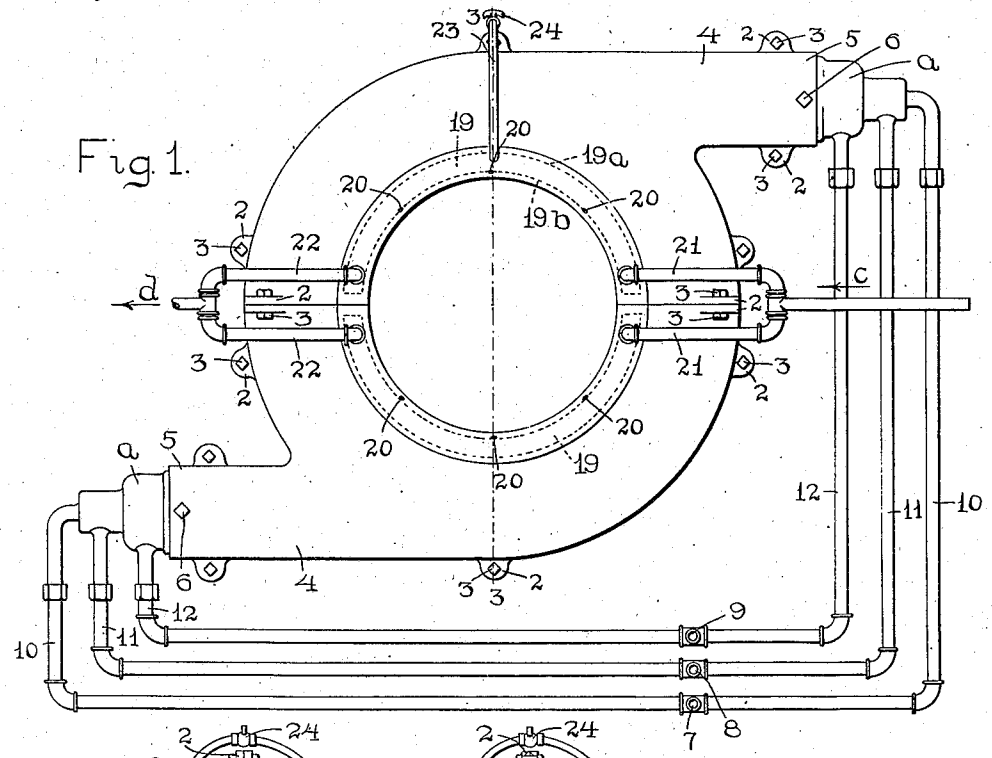


Fig. 2.

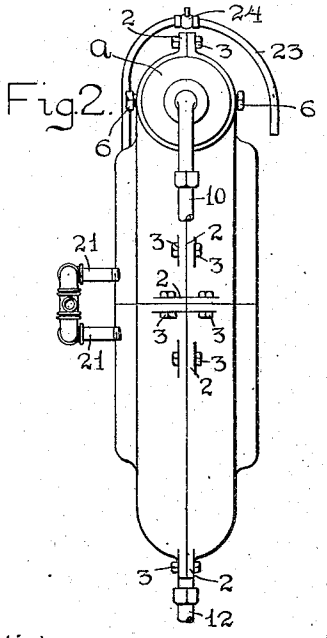


Fig. 3.

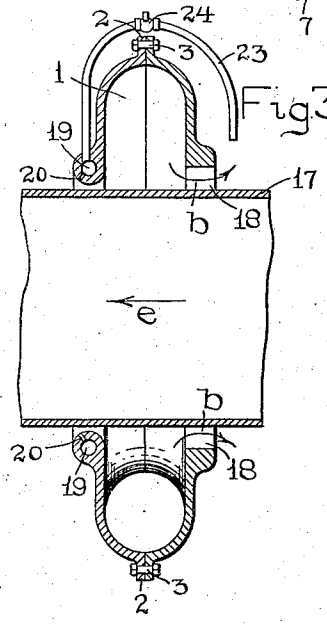
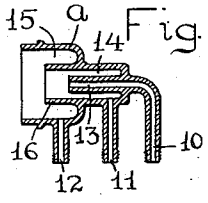


Fig. 4.



Witnesses

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UNITED STATES PATENT OFFICE.

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ANNULAR BURNER.

No. 911,373. Specification of Letters Patent. Patented Feb. 2, 1909.

Application filed November 23, 1904. Serial No. 234,018.

To all whom it may concern:

Be it known that I, LOUIS H. BRINKMAN, a citizen of the United States, residing at West Hartford, in the county of Hartford and State of Connecticut, have invented a new and useful Improvement in an Annular Burner, of which the following is a specification, accompanied by drawings forming a part of the same, in which—

Figure 1 is a front elevation of my improved annular burner. Fig. 2 is a side or edge view. Fig. 3 is a sectional view on line 3—3, Fig. 1, and Fig. 4 is a detached view, shown in section, of the device for controlling the admission of gas and air.

Similar reference letters and figures refer to similar parts in the different views.

My invention relates to an annular burner designed for heating the entire periphery of a pipe in a limited section of its length such as is used in pipe bending apparatus to surround and heat an annular portion of the pipe, thereby allowing it to be bent. It also includes means for cooling the heated portion in order to maintain the curvature after the burner is applied to an adjacent portion of the pipe.

My invention consists in the construction and arrangement of parts as hereinafter described and pointed out in the annexed claims.

Referring to the accompanying drawings 1 denotes a hollow annular chamber, preferably cast in halves, with each half again divided diametrically as shown in Fig. 2. The four pieces are fastened together to form the hollow chamber 1 by any suitable means, as by flanges 2 and bolts 3.

Approximately tangent to the annular chamber 1 are hollow shells 4 which are cast integrally with the annular chamber 1 and extend in opposite directions. These hollow shells 4 communicate with the interior of the chamber 1 and are open at their outer ends 5.

Gas and air are admitted under pressure to the annular chamber 1 by the shells 4, through burners *a* shown in section in Fig. 4. The burners *a* are inserted in the outer end of each of the shells 4 where they are removably held by set screws 6. These burners are connected with air and gas supply pipes 7, 8 and 9 by pipes 10, 11 and 12, of which 10 and 12 are for the admission of air and 11 for gas.

The interior construction of the burners *a* is shown in Fig. 4 and is as follows:—The pipe 10 conducts air under pressure into a central air passage 13, the pipe 11 conducts gas under pressure into an annular passage 14 concentric with the central air passage 13, and the pipe 12 conducts air under pressure into an annular passage 15 concentric with the gas passage 14. The passages 14 and 15 are separated by a flange 16, and the air passages 13 and 15 and the gas passage 14 communicate with the shell 4, and through the shell 4 into the annular chamber 1. The air and gas therefore intermingle in the shell 4 which forms a mixing chamber for the gaseous fuel which when ignited fills the entire chamber with flame, which is carried in a forcible current around the annular chamber escaping through the opening 18 around the pipe to be bent, as shown by the arrows *b*, *b*, Fig. 3.

When the heated section of pipe 17 inclosed in the burner has become sufficiently softened to receive the required bend, the position of the burner is changed and the portion of the pipe which has already become partially heated by the escape of flame through the opening 18 is inclosed by the annular burner. The burner is provided with a water chamber 19 having holes 20 for the escape of water against the heated section of the pipe, which is thereby cooled in order that the bend given to the heated section may be maintained. As the side of the burner containing the water chamber is cast in halves, I form the water chamber 19 in two parts as shown by broken lines 19^a and 19^b in Fig. 1. Water is admitted under pressure to the chambers 19 through pipes 21 in the direction of the arrow *c* and leaves them through the pipes 22 as shown by the arrow *d*, a certain amount of it passing out upon the pipe 17 through the holes 20. Communicating with the water chamber 19 is a pipe 23 which is arranged to deliver water from said chamber 19 upon a portion of the pipe 17 immediately in front of the opening 18. The position of the pipe 23 is so arranged with reference to the burner and the means of exerting a bending strain that the water is delivered upon the pipe 17 on the inside of its curvature. In this way the temperature of a limited portion of the pipe on the inside of the bend is reduced so that its resistance to a bending strain is slightly increased and buc-

kling or wrinkling of the pipe due to upsetting is prevented. The flow of water through the pipe 23 is regulated by a stop cock 24.

The operation of my improved burner is as follows:—After the pipe 17 has been placed in position surrounded by the annular chamber 1, gas and air under pressure are admitted to the chamber and there ignited as has been already described. When that portion of the pipe 17 surrounded by the burner reaches the necessary heat it is subjected to a bending strain by any suitable means, not shown, and the position of the pipe is changed to bring the heated portion beneath the cooling streams which flow from the holes 20. This may obviously be accomplished either by a movement of the pipe 17 in the direction of the arrow *e*, or by the movement of the burner in the opposite direction, and thus heating and bending of successive sections of the pipe may be continued as long as desired.

What I claim as my invention and desire to secure by Letters Patent is:—

1. In an annular burner designed to heat successive portions of a pipe, the combination with an annular shell inclosing a combustion chamber arranged to surround said pipe, and means for applying heat to a portion of the pipe outside of and adjacent to said shell.

2. In an annular burner designed to heat successive portions of a pipe, the combination with an annular shell inclosing a combustion chamber arranged to surround said pipe, and having an annular opening around said pipe for the escape of flame from said shell in contact with said pipe outside of said shell.

3. In an annular burner, the combination of an annular combustion chamber having an opening to receive a pipe, means for heating an annular portion of said pipe on one side of said chamber, and means for cooling an annular portion of said pipe on the other side of said chamber.

4. In an annular burner, the combination of an annular combustion chamber having a central opening adapted to receive a pipe, means for heating an annular portion of said pipe adjacent to said annular combustion chamber and means for cooling a limited part of said annular heated portion.

5. In an annular burner, the combination of an annular shell having a central opening adapted to receive a pipe, with an annular opening around the pipe for the escape of flame from said shell, means for admitting a mixture of air and gas in a current tangential to said shell, and a water chamber in said shell having openings for the delivery of water to the pipe.

6. In an annular burner, the combination of an annular shell having a central opening to receive a pipe and an opening for the escape of the products of combustion next the pipe, of means for applying water to a limited portion of the pipe next said opening.

7. In an annular burner, the combination of an annular chamber adapted to surround a pipe, said chamber being open on the inside toward the pipe and having an opening for the products of combustion next the pipe, of means for admitting currents of gas and air under pressure to said chamber, and means for applying water to a limited portion of the pipe next to said opening.

8. In an annular burner, the combination of an annular chamber adapted to surround a pipe, means for filling said annular chamber with air and gas under pressure, an annular water chamber on one side of said burner, means for admitting water to said chamber, means for applying water from said water chamber to a heated annular portion of the pipe, and means for applying water from said chamber to a limited portion of the pipe on the opposite side of said burner.

Dated this 21st day of November 1904.

LOUIS H. BRINKMAN.

Witnesses:

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