

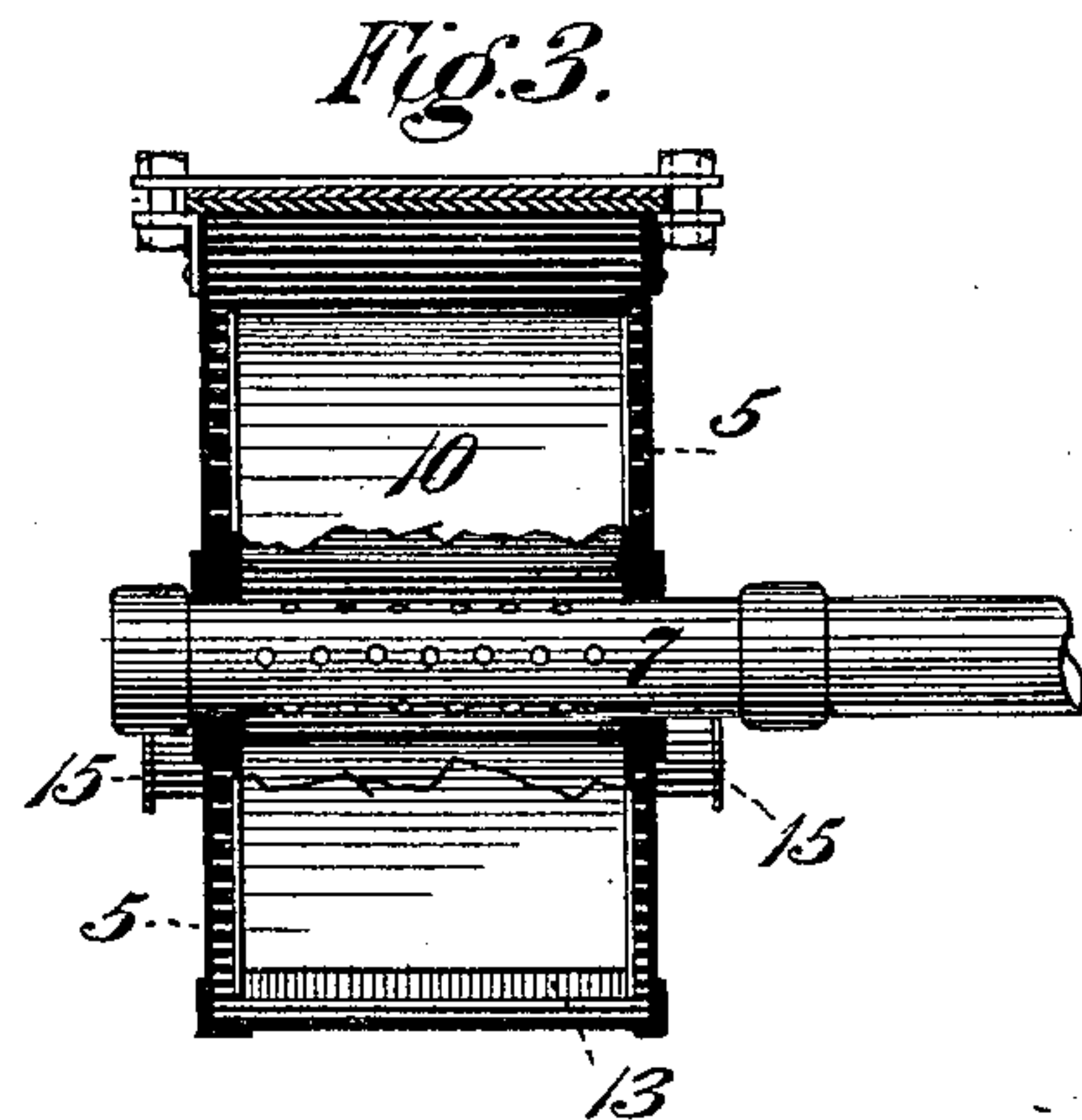
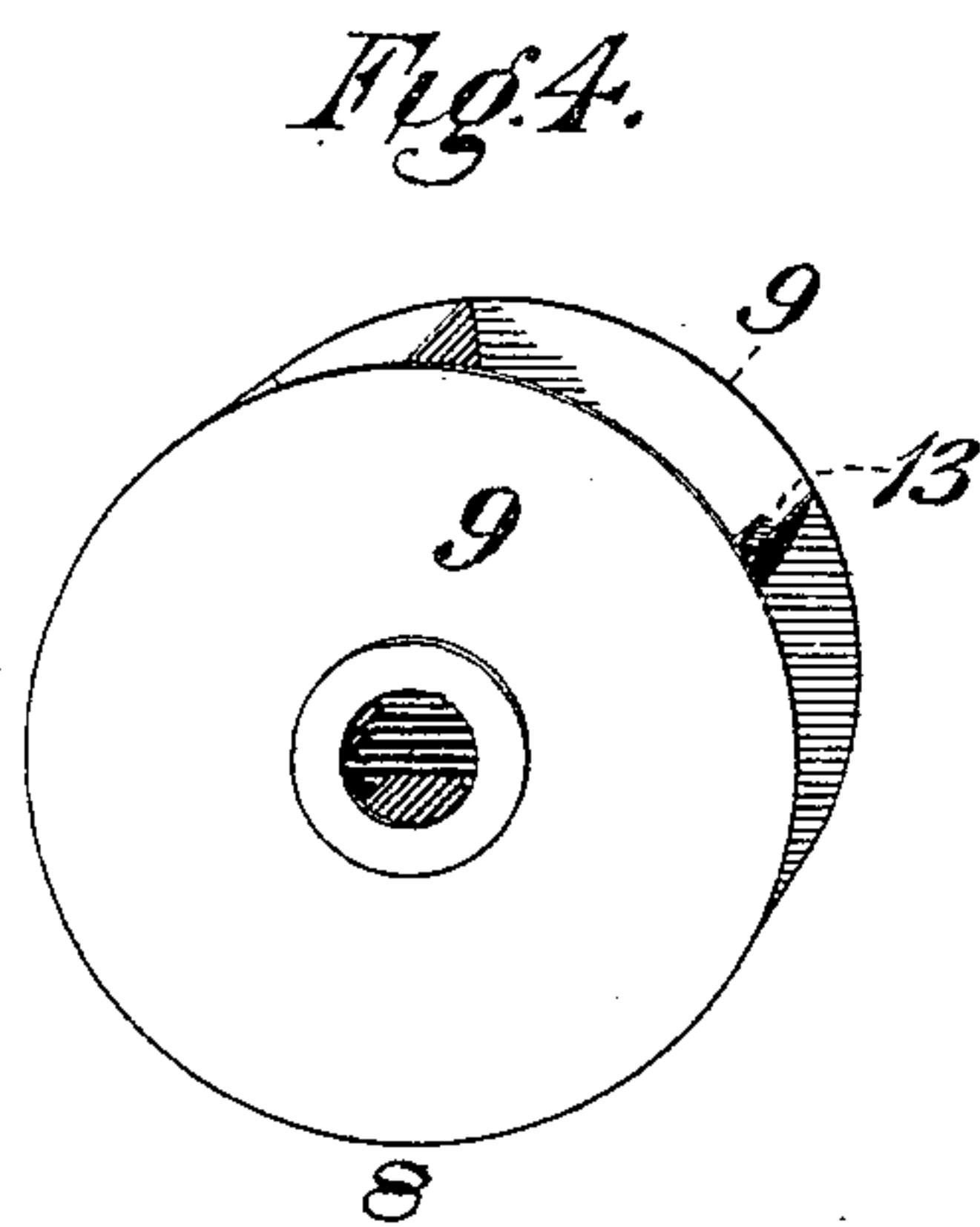
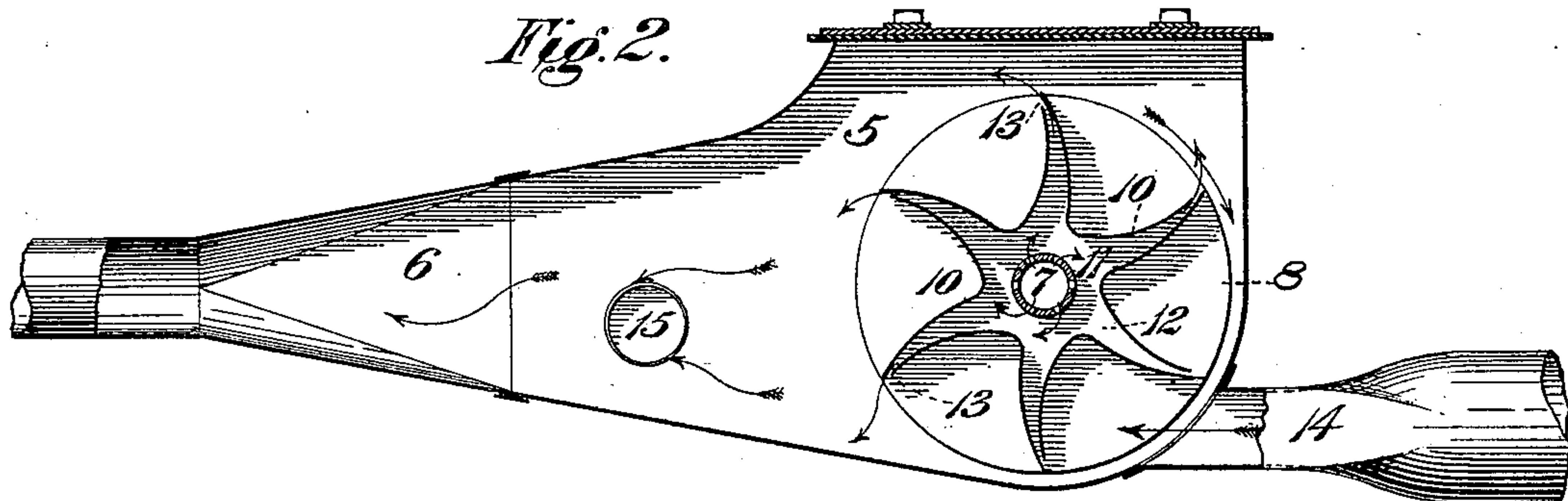
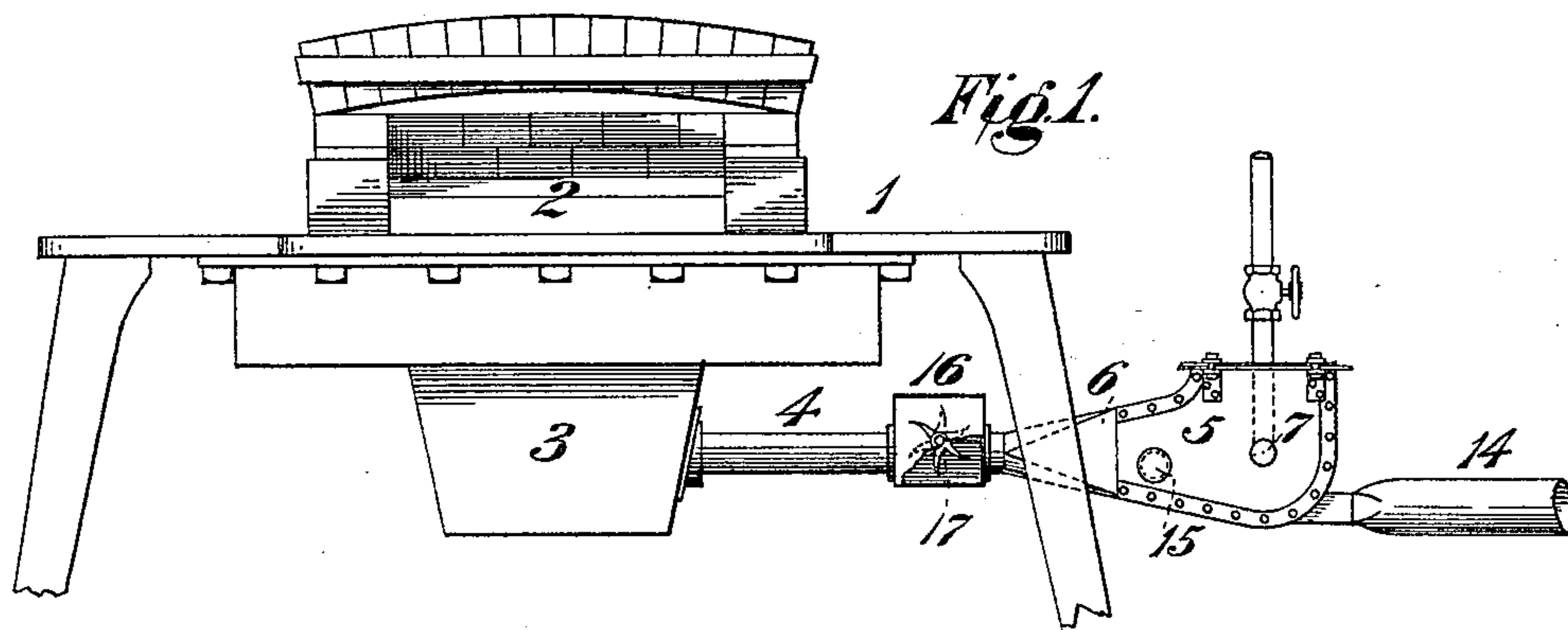
(No Model.)

C. KONOLD & W. H. HAYS.

GAS COMBUSTION APPARATUS.

No. 344,385.

Patented June 29, 1886.



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UNITED STATES PATENT OFFICE.

CHRISTIAN KONOLD AND WILLIAM H. HAYS, OF PITTSBURG, PA.

GAS-COMBUSTION APPARATUS.

SPECIFICATION forming part of Letters Patent No. 344,385, dated June 29, 1886.

Application filed September 2, 1885. Serial No. 175,981. (No model)

To all whom it may concern:

Be it known that we, CHRISTIAN KONOLD and WILLIAM H. HAYS, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, citizens of the United States, have invented or discovered certain new and useful Improvements in Gas-Combustion Apparatus, of which improvements the following is a specification.

10 In the accompanying drawings, which make part of this specification, Figure 1 is a view in front elevation of a forge having attached thereto our improved gas-and-air-mixing apparatus. Fig. 2 is a sectional elevation of the
15 mixing apparatus on an enlarged scale. Fig. 3 is a transverse sectional elevation of the same. Fig. 4 is a perspective view of the mixing-wheel.

Our invention relates to certain improvements in apparatus for the utilization of gas as a heating agent in forges and other heating-furnaces, and has for its object the thorough mixing or commingling of the gas and air in suitable proportions prior to the ignition and
25 combustion of the gas in the furnace, thereby insuring a more perfect combustion than is attainable when the air is supplied to the gas during combustion; and to these ends our invention consists in the construction and combination of parts, substantially in the manner
30 hereinafter more fully described and claimed.

In the drawings our invention is shown as applied to a forge, 1, having the hearth 2 and the combustion-chamber 3. To one side of
35 the box forming the combustion-chamber is attached a pipe, 4, connecting said box with the mixing-chamber 5. This chamber is a box-like structure having one of its sides formed by a tapering horn-like extension, 6, the end of such extension being connected to
40 the pipe 4.

Through the sides of the chamber 5 is inserted the pipe 7, connected at one end to any suitable source of gas-supply, the opposite end
45 of the pipe being closed in any suitable manner. On this pipe, within the chamber, is loosely mounted the agitating or mixing wheel 8, said wheel consisting of the side plates or disks, 9, between which are secured the plates
50 10, said plates being so bent and secured to the side disks in such relation to each other

as to form a central receiving-chamber, 11, and radiating passages 12, having lateral escape or exit openings 13 at the ends of the arms forming radiating passages. The portion of the
55 pipe 7 inclosed by the mixing-wheel 8 is perforated, as shown, for the passage of the gas into the receiving-chamber 11, whence it flows through the radiating passages 12 and escapes from the contracted lateral openings 13. The
60 reaction of the gas escaping from these lateral openings will produce a rotary movement of the mixing-wheel.

Although we have shown the arms forming the radiating passages as slightly curved, they
65 may be made straight, and the exit-openings may be made in line with the passages 12 in place of at one side thereof.

Near the lower corner of the mixing-chamber is connected the air-pipe 14, connected
70 with some suitable air-forcing apparatus—as, for example, a fan. The side of the mixing-chamber to which the air-blast pipe is connected is curved to conform with the shape of the mixing-wheel, and the pipe is secured to
75 the chamber in such relation to the arms of the wheel that the air-blast will impinge upon said arms and rotate the wheel on its pipe-shaft.

In the ordinary use of our apparatus the
80 mixing-wheel is driven by the air-blast, as above stated; but in some cases it may not be practicable or desirable to use an air-blast, and in such cases it is proposed to utilize the reactionary force of the gas-escape from the
85 wheel to rotate the same, the arms of the wheels being so bent and the lateral escape-openings so located as to drive the wheel in such a direction as will draw in a sufficient air-supply through the pipe 14.

In the sides of the mixing-chamber are secured short sections of pipe provided with caps 15, which are made to fit sufficiently tight to remain in place at the ordinary pressure of gas and air in the chamber, but can be blown
90 off in case of a sudden or dangerous increase of pressure. As the gas escapes from the wheel, which is rapidly driven by the air-blast, it is intimately and thoroughly mixed with the air, the currents of gas and air being broken
95 up, as it were, by the rotation of the wheel. After being mixed the air and gas flow through
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the pipe 4 into the combustion-chamber 3, where the gas is ignited.

In some cases we have found it desirable to further agitate and mix the gas and air, and for that purpose a box, 16, is interposed in the line of the pipe 4, and in said box is mounted a loosely-rotating wheel, 17, having broad arms or spokes. This wheel 17 is so mounted with relation to the incoming currents of gas and air that such currents will impinge upon the arms or spokes and rapidly rotate the wheel, thereby effecting a further and more intimate mixture of the air and gas.

In addition to mixing the air and gas the chambers 5 and 16 and the mixing-wheels will effect a certain retardation to the flow of the air and gas, thereby permitting of a more perfect combustion than would be possible if the gas and air flowed into the combustion-chamber at their normal pressure.

If desired, the gas may be introduced directly into the mixing-chamber in lieu of through the wheel, as described, and in such cases the wheel may be made with its broad blades in place of the hollow arms, as described.

We claim herein as our invention—

1. A gas-supply, in combination with an air-supply and a movable mixing device interposed between the point of supply and the

point of combustion, said mixing device being operated by one of the currents flowing from the point of supply, substantially as set forth.

2. In a gas-and-air-mixing apparatus, a gas-supply pipe, in combination with a hollow wheel having radial outlets and loosely mounted on said supply-pipe, substantially as set forth.

3. In a gas-and-air-mixing apparatus, a box or case forming a mixing-chamber having an opening for the admission of air, in combination with a gas-supply pipe arranged in said chamber, and a hollow wheel having lateral openings in its arms and mounted loosely on the supply-pipe, substantially as set forth.

4. A gas-supply, in combination with an air-supply, a movable mixing device interposed between the point of supply and the point of combustion, and a secondary movable mixing device suitably located for further agitating the mixed gases during their passage to the point of combustion, substantially as set forth.

In testimony whereof we have hereunto set our hands.

CHRISTIAN KONOLD.
WILLIAM H. HAYS.

Witnesses:

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