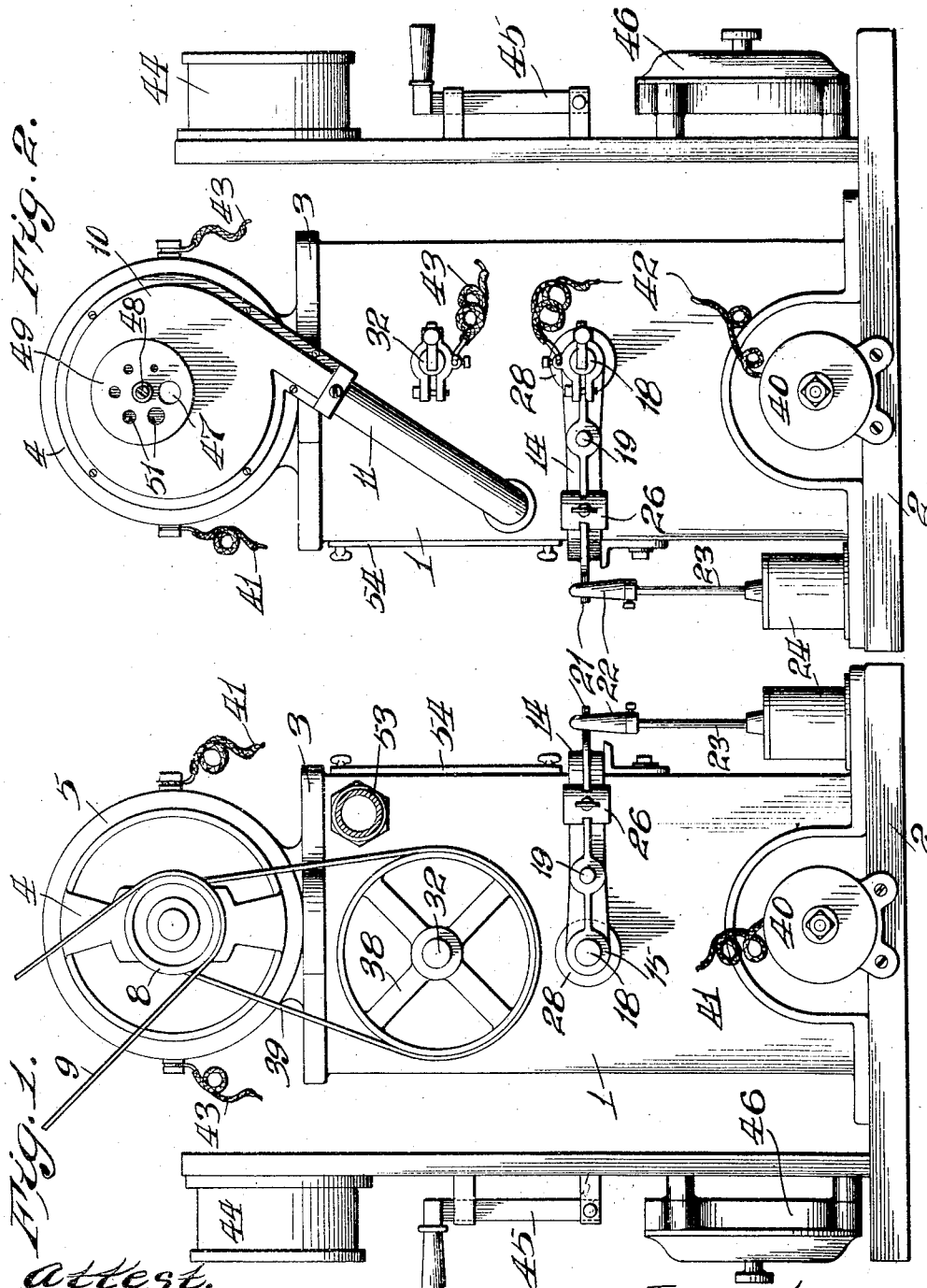


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 APPARATUS FOR GENERATING GASES BY ELECTRIC DISCHARGES IN AIR.
 APPLICATION FILED MAY 14, 1909.

932,161.

Patented Aug. 24, 1909.

3 SHEETS—SHEET 1.



Attest.
 L. G. McKee,
 Notary Public

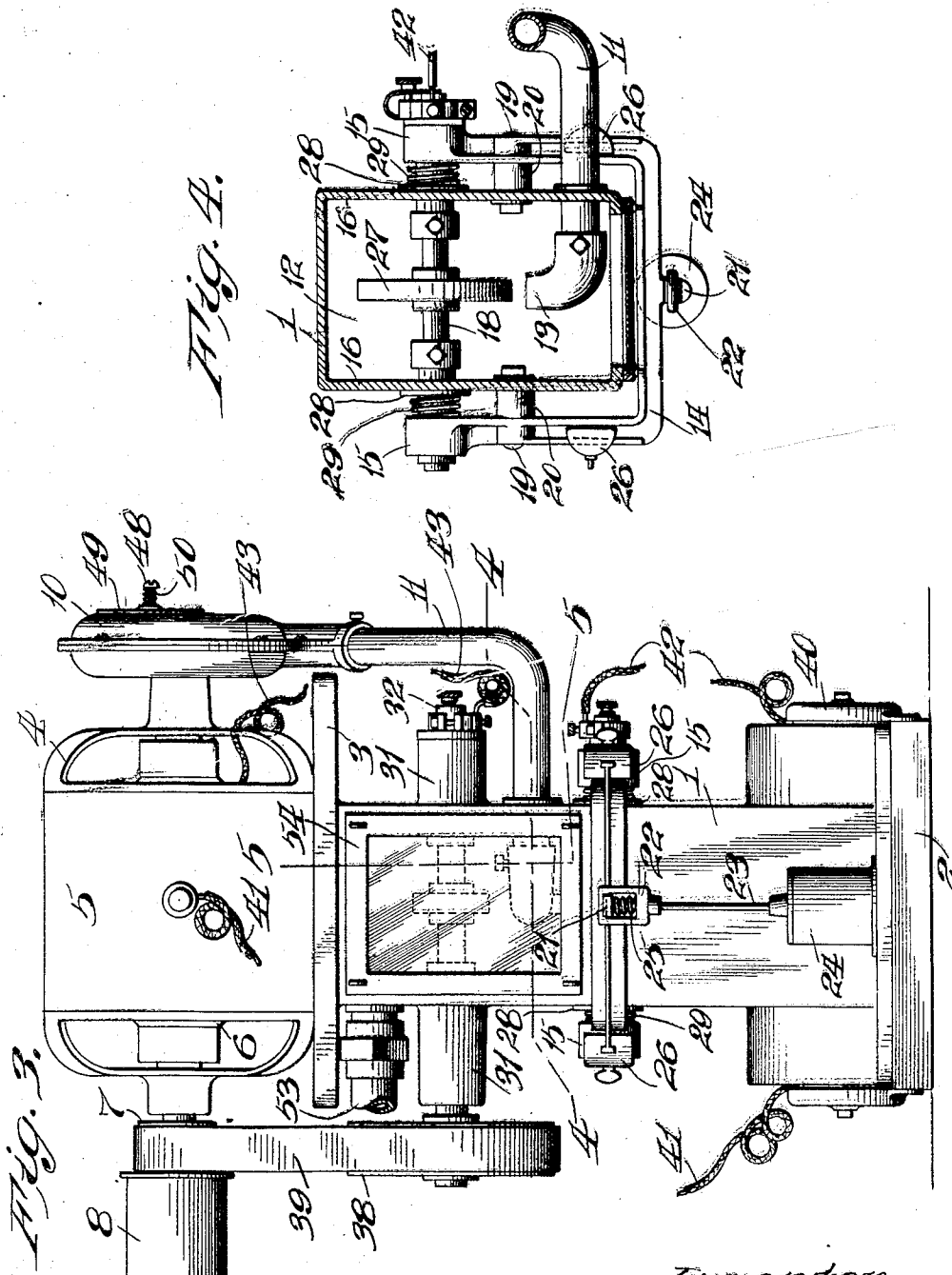
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Fig. 5.

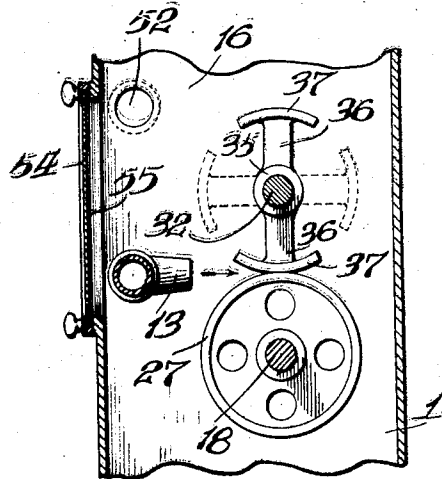


Fig. 6.

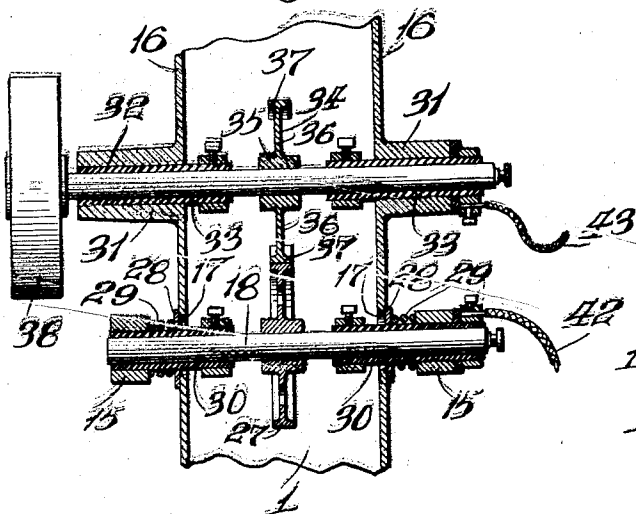
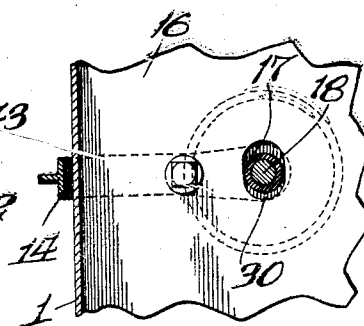


Fig. 7.



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UNITED STATES PATENT OFFICE.

JOHN E. MITCHELL, OF ST. LOUIS, MISSOURI.

APPARATUS FOR GENERATING GASES BY ELECTRIC DISCHARGES IN AIR.

932,161.

Specification of Letters Patent.

Patented Aug. 24, 1909.

Application filed May 14, 1909. Serial No. 495,954.

To all whom it may concern.

Be it known that I, JOHN E. MITCHELL, a citizen of the United States, residing in the city of St. Louis and State of Missouri, have invented new and useful Improvements in Apparatus for Generating Gases by Electric Discharges in Air, of which the following is a specification.

This invention relates to an improved apparatus for use in generating a mixture of air and peroxid of nitrogen, (NO_2) for use in bleaching flour. A typical machine for this purpose is that patented to James N. Alsop, May 3, 1904, No. 758,884, in which reciprocating electrodes are brought into contact with stationary electrodes, and this machine, and various improved machines embodying the same principle of operation, have been extensively used throughout the United States for the purpose indicated. The present invention aims to increase the economy and efficiency of such an apparatus by providing a pair of revolving circular electrodes, one of which is mutilated to provide the necessary intermittent contact and drawing out of the arc. By this construction the repeated contact of the electrodes is easily, and comparatively noiselessly, produced; the life of the electrodes is very greatly prolonged; less power is required to operate the apparatus, a smaller dynamo may be used for generating the current, and wear of the electrodes is reduced to the minimum. Furthermore, the rotary electrode may be driven by a belt or other connection directly from the armature shaft of the dynamo, and owing to the simplicity of this motion, as compared with the reciprocating motion of the Alsop machine, the machine as a whole requires fewer number of parts and can be constructed in compact form and at less cost than the machine of the reciprocating type.

In the drawings: Figure 1 is a view in side elevation of a machine constructed according to my invention. Fig. 2 is a similar view looking at the opposite side to that illustrated in Fig. 1. Fig. 3 is a view in front elevation. Fig. 4 is a sectional plan view on the line 4-4 of Fig. 3. Fig. 5 is a vertical sectional view through a portion of the flame chamber, taken on the line 5-5 of Fig. 3. Fig. 6 is a transverse sectional view through the flame chamber and the electrodes, and, Fig. 7 is a sectional detailed

view of a part of one wall of the flame chamber illustrating the manner of mounting the lower electrode.

Referring now to the drawings, 1 indicates a casing having a base 2 and a top 3 on which latter is supported a dynamo 4. The field of the dynamo is indicated, generally, by 5, and the armature by 6. On the shaft of the armature is a pulley 7 and a somewhat larger pulley 8, which latter is driven by a belt 9 from any suitable source of power. On the shaft of the armature is also a fan (not shown) inclosed in a casing 10 from which a pipe 11 leads into the flame chamber 12 where it is provided with a discharge nozzle 13.

14 indicates a yoke having parallel arms terminating in bearings 15. 16 indicates the two side walls of the flame chamber, each of which is provided with an elongated aperture 17, one of which is shown in Fig. 7.

18 indicates a shaft which extends at opposite ends through these apertures 17, and is journaled in its outer ends in the bearings 15 of the yoke 14. Between the apertures 17 and the front of the flame chamber 12 pivots 19 are mounted in the opposite walls of the flame chamber, and the arms of the yoke 14, at a point some distance removed from the bearings 15, are provided with bearings 20 which receive the pivots 19, which latter thus serve as fulcrums for said yoke.

21 indicates a lug located centrally of the body of the yoke which engages under the upper end of a bail 22 mounted on a rod 23 which has a piston (not shown) working in a dash-pot 24 containing oil. A coil spring 25 is inserted between the lug 21 and the bottom of the bail 22 to prevent lost motion. Weights 26 are adjustably mounted on the arms of the yoke 14, the disposition of these weights determining the pressure or lifting force exerted upon the shaft 18. Mounted on this shaft is a circular metal electrode 27. Circular plates 28, loosely mounted on the shaft 18, cover the elongated apertures 17 to prevent the access of dust and dirt to the flame chamber, and are held in position by coil springs 29 inserted between said plates and the bearings 15. Suitable insulating material 30 is interposed between the shaft and the walls of the casing and the bearings 15. On the outer side of the walls 16 of the flame chamber above the shaft 18 I provide bear-

ings 31 in which are mounted the ends of a shaft 32, suitable insulating material 33 being interposed between the shaft and the bearings. Centrally of this shaft is fixedly secured a rotary electrode 34 which comprises a hub 35 and oppositely extending arms 36, on the outer end of each of which is an electrode 37 which is in the form of a segment of a circle. When rotated these electrodes come in contact with the surface of the circular electrode 27 and rotate the latter. On the one end of the shaft 32 is a pulley 38 which is driven by a band 39 from the pulley 7 on the armature shaft.

The electrical arrangement does not differ in principle from that employed in the well-known Alsop machine, and comprises a coil 40, a wire 41 leading from one side of the dynamo to one end of said coil, a wire 42 leading from the other end of said coil and electrically connected with the electrode 27, and a wire 43 electrically connected at one end with the electrode 34 and leading to the other side of the dynamo. The coil 40 is for increasing the potential of the current to overcome the resistance between the electrodes as they separate, and thus maintain the arc.

In operation the yoke 14 is normally over-balanced and its outer end thus tends to lift the shaft 18 and its electrode 27. As the shaft 32 is revolved from the pulley 38 the electrodes 37 will come in contact with the periphery of the electrode 27, this contact being a yielding one, owing to the arrangement and operation of the yoke 14 as previously described. As the electrode 34 revolves the engagement of the contacts 37 with the electrode 27 will also cause the latter to revolve, thus continuously presenting new points of contact. As the contacts 37 diverge and finally separate from the surface of the electrode 27 arcs are drawn out of the well-known flame type, and the air discharged from the nozzle 13 will be modified by the discharges, the result being the production of a body of air carrying a small portion of peroxid of nitrogen. The discharge nozzle 13 is located to direct the blast of air directly between the two electrodes and by this means the arcs as formed are constantly extended, or blown outward, by the air and thus short circuiting between the electrodes is prevented. The contact of the mutilated electrode with the circular electrode 27 would ordinarily tend to produce vibration of the latter, or if the same were stationary would result in very loud noise. Under the arrangement described, however, the electrode 27, while yieldingly mounted, is still held in substantially uniform relation to the path of movement of the contacts 37 by the provision of the dash-pot 24 which, as understood, will only permit a slow or gradual descent therein of the

piston on the rod 23, and thus vibration of the electrode 27 is reduced to the minimum and the noise produced in operation is not at all pronounced.

44 indicates a volt meter, 45 a switch and 46 a rheostat. These parts need not be particularly described, nor need the various electrical connections between these instruments and the other parts of the apparatus be set forth.

The outer side of the fan casing 10 is provided with an aperture 47. Projecting from said fan casing is a pin 48 on which is rotatably mounted a disk 49 which is held in yielding contact with the side of the fan casing by means of a spring 50. The disk 49 is provided with a series of graduated apertures 51, and by revolving said disk to bring one or the other of the apertures 51 over the aperture 47 the amount of air drawn in by the fan and supplied to the flame chamber may be regulated.

52 indicates an opening for the escape of the modified air from the flame chamber and 53 indicates the exit pipe for conducting said modified air to the place of application.

54 indicates a glass face plate covering an opening 55 in the front of the flame chamber through which the operation of the apparatus may be observed, and by removing the same access to the electrodes may be had.

The electrodes 27 and 34 may be of metal or other material found suitable for the purpose.

I claim:

1. An apparatus of the class described comprising two rotatable electrodes forming the terminals of an electric circuit and having circular contacting surfaces, one of said electrodes being mutilated, means for rotating one of said electrodes and thereby, by contact, the other electrode, whereby said circuit will be alternately closed and opened with the intermediate production of arcs, and means for delivering a blast of air in proximity to said electrodes.

2. An apparatus of the class described comprising two rotatable electrodes forming the terminals of an electric circuit and having circular contacting surfaces, one of said electrodes being mutilated, means for rotating the mutilated electrode, whereby said circuit will be alternately closed and opened with the intermediate production of arcs, and means for delivering a blast of air in proximity to said electrodes.

3. An apparatus of the class described comprising a rotatable electrode having circular separated contacts, a circular electrode yieldingly supported to have its surface engaged by said contacts during the revolutions of the latter, said electrodes forming the terminals of an electric circuit, means for rotating one of said electrodes whereby said circuit will be alternately closed and

opened with the intermediate production of arcs, and means for delivering a blast of air in proximity to said electrodes.

4. An apparatus of the class described comprising a flame chamber, a rotatable electrode mounted therein and having separated contacts, a circular electrode mounted in said flame chamber, means for holding said circular electrode in yielding relation to the contacts of the first electrode, means for adjusting the pressure between the electrodes, means for rotating one of said electrodes whereby said circuit will be alternately closed and opened with the intermediate production of arcs, means for delivering a blast of air in proximity to said electrodes, said electrodes forming the terminals of an electric circuit and said flame chamber having an exit.

5. An apparatus of the class described comprising a chamber, an electrode rotatably mounted therein and having circular separated contacts, a yoke fulcrumed intermediate its ends on the walls of said chamber, a shaft mounted in the inner ends of said yoke and extending through said chamber, a circular electrode secured on said shaft and adapted to be engaged by said contacts, means for controlling the rocking of said yoke on its fulcrum, means for rotating one of said electrodes, means for delivering a blast of air in proximity to said electrodes, said flame chamber having an exit, and said electrodes being connected with a source of electricity.

6. An apparatus of the class described comprising a flame chamber, a pair of electrodes mounted in said flame chamber and connected with a source of electricity, and adapted to be rotated in contact with each other, means for rotating said electrodes, a pipe leading into said chamber and having a nozzle for directing air in proximity to said electrodes, a fan associated with said pipe for forcing air therethrough, and means for regulating the amount of air delivered

by said fan to the flame chamber, the flame chamber having an exit.

7. An apparatus of the class described comprising a chamber, an electrode rotatably mounted therein and having circular separated contacts, a yoke fulcrumed intermediate its ends on the walls of said chamber, a shaft mounted in the inner ends of said yoke and extending through said chamber, a circular electrode secured on said shaft and adapted to be engaged by said contacts, a dash-pot containing oil, a rod operatively connected to the outer end of said yoke and having a piston working in said dash-pot, means for rotating one of said electrodes, means for delivering a blast of air in proximity to said electrodes, said chamber having an exit and said electrodes being connected with a source of electricity.

8. An apparatus of the class described comprising a chamber, an electrode rotatably mounted therein and having circular separated contacts, a yoke fulcrumed intermediate its ends on the walls of said chamber, a shaft mounted in the inner ends of said yoke and extending through said chamber, a circular electrode secured on said shaft and adapted to be engaged by said contacts, a lug on the outer end of said yoke, a dash-pot containing oil, a rod having a piston at its lower end working in said dash-pot and a bail at its upper end engaging said lug, a spring interposed between said lug and the bottom of said bail, means for rotating one of said electrodes, means for delivering a blast of air in proximity to said electrodes, said chamber having an exit, and said electrodes being connected with a source of electricity.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

JOHN E. MITCHELL.

Witnesses:

H. MARMADUKE,
EDWIN T. BERRY.