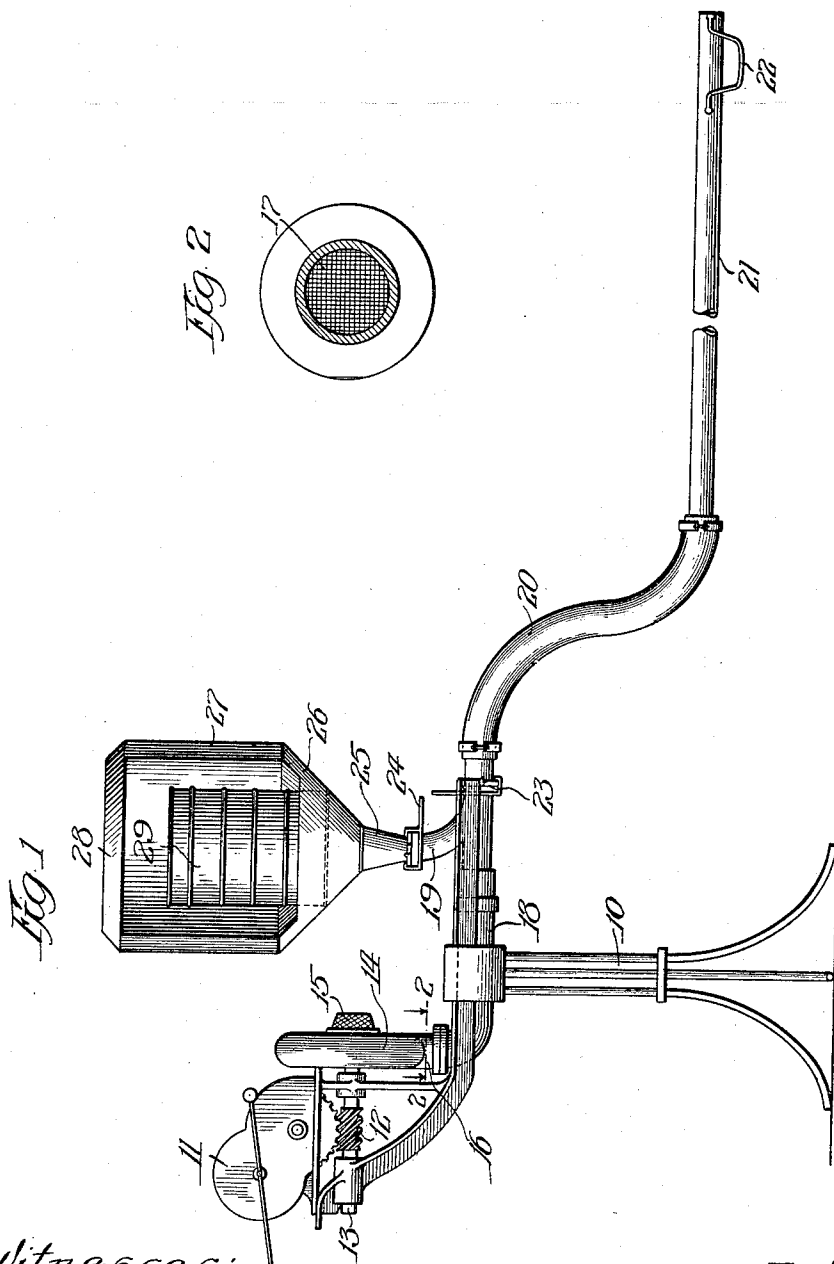


W. H. PLUMMER & J. TRESIDER.
 METHOD OF AND APPARATUS FOR CHARGING POWDER.
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Witnesses:

Ed. Quinn
W.D. Butler.

Inventors:

William H. Plummer
John Tresider
 By *William H. Plummer & John Tresider*
Attys.

UNITED STATES PATENT OFFICE.

WILLIAM H. PLUMMER AND JOHN TRESIDER, OF COLERAINE, MINNESOTA.

METHOD OF AND APPARATUS FOR CHARGING POWDER.

1,029,630.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that we, WILLIAM H. PLUMMER and JOHN TRESIDER, citizens of the United States, residing at Coleraine, in the county of Itasca and State of Minnesota, have invented certain new and useful Improvements in Methods of and Apparatus for Charging Powder, of which the following is a specification.

Our invention relates to the art of mining and relates particularly to a method of and apparatus for charging black powder into a previously formed opening.

In some sections of the country certain ores, particularly iron, are found at or near the surface of the ground and where so found mining is done by the use of steam shovels. However, in some cases a crust of earth covers the ore and to avoid an excessive amount of hand labor, the crust of earth is broken up by a charge of powder, the loose earth being then removed by the shovel. In such cases the workmen form what are called "gopher" holes, these holes being formed in the side of the bank to a distance of approximately twenty feet and of a size to permit a man to crawl thereinto. After the formation of the holes a quantity of black powder is placed in the extreme end, tamped and then exploded. The customary method of placing the powder into the holes is to pour a quantity thereof into an open box on the end of a long rod, project the box into the extreme end of the hole, turning the box upside down emptying the powder. Another way, when the hole is inclined, is to insert a wooden trough and allow the powder to run down the trough to the end of the same. Both of these methods are very objectionable owing to the danger they involve. They necessitate the opening of the powder can in the pit and pouring the powder into the box or the trough, with the possible danger of an explosion from a spark that might come from a passing locomotive, steam shovel or a workman's pipe. Again, in case there was a nail in the box or the trough used for charging the powder, there would be the possibility of striking a spark when the box or trough was withdrawn.

One of the objects of the present invention therefore is to provide a method of and apparatus for introducing the powder into the holes in such manner that the powder is never exposed to the atmosphere, is conducted

to the point at which it is to be exploded without danger of ignition and further, to provide means whereby, if desired, sand may be placed over the powder to avoid any possible chance of ignition due to the tamping thereof.

Our invention will be more readily understood by reference to the accompanying drawings, wherein,

Figure 1 is a side elevation of apparatus by means of which our improved method may be carried out, and Fig. 2 is a section on the line 2—2 of Fig. 1.

Referring more particularly to the drawings, it will be seen that on a base 10 we mount a blower consisting of motion-multiplying gears 11, meshing with a worm 12, keyed to the blower-shaft 13, to which is secured the blower-fan contained in the casing 14. The air inlet to the blower is covered by a spark arrester 15, and as a further precaution the outlet pipe 16 of the blower contains a further fine mesh screen 17, which serves also as a spark arrester. The pipe 16 is suitably connected to a conduit 18, having a branch 19. A flexible tube 20 is secured to the pipe 18, and to the tube 20 is secured a rigid,—preferably fiber,—tube 21. While as stated, this tube is preferably composed of fiber, it may be composed of copper, brass, lead or any other material which will not strike a spark when brought into contact with a rock. To the outer end of the tube 21 we attach runners 22, by means of which the tube may be kept off the surface and thus prevent the accumulation of dirt in the open end thereof while the tube is being inserted into the opening. Preferably we provide a quick detachable union 23, between the pipe 18 and the flexible-tube 20.

On the upper end of the branch 19, we provide a hand-operated union or clamp 24, by means of which the neck 25 of a casing or shield may be secured to the branch. This shield is composed of a preferably cylindrical sheet metal-receptacle, having a downwardly and inwardly flaring portion 26, straight side walls 27 and a top 28. This shield is preferably formed of copper or similar material which will not strike a spark. If desired, the downwardly flaring portion only may be constructed of copper. As shown, one side is left open by means of which a powder can 29 may be placed in the receptacle. It will be seen that a powder can, when placed bottom up in the recepta-

cle, will rest with its edges against the downwardly flaring sides 26 and effectually prevent the entrance of sparks to the powder flowing from the can.

5 Our improved method may be described as follows: Assuming that a gopher hole has been formed, apparatus such as here described is brought to the mouth of the opening, the tube 21 inserted to within say two
10 feet of the end of the hole. A can of black powder with the cap removed is placed bottom up in the receptacle and the blower started in operation. In this way it will be seen that the powder is blown into the opening in such manner that it is properly located and without danger of ignition from sparks or from accidentally contacting a metallic object with a stone in the opening. Furthermore, it will be seen that there is a
20 considerable saving in powder due to the fact that all the powder is placed in the proper location, none being scattered along the opening as is the case with other methods. After the powder has been inserted it
25 may be found preferable to blow in sand, in which case the powder can is removed and dry sand placed in the receptacle, the blower being continued in operation. After the powder has been covered, further earth
30 may be shoveled in and tamped without danger of explosion.

It will be seen that although specific mechanism has been described by means of which our improved method may be carried
35 out, other apparatus might be employed and that modifications might be made in the described apparatus, all without departing from the spirit of our invention.

In place of the blower it may be found
40 desirable to employ a cylinder of compressed air for the purpose of blowing powder into the opening.

We claim:

1. The method of charging powder into a
45 hole which consists in inserting a tube into the hole, placing a quantity of powder in a receptacle protected from sparks, then generating a blast of air and blowing the powder into the hole, substantially as described.

50 2. The method of charging powder into a hole which consists in inserting a tube into the hole to the end thereof, then withdrawing the tube a short distance, then placing a quantity of powder in a receptacle protected from sparks, then generating a blast
55 of air and blowing powder into the hole, substantially as described.

3. The method of charging powder into a hole which consists in inserting a tube into the hole to the end thereof, then withdrawing the tube a short distance, then placing a quantity of powder in a receptacle protected from sparks, then generating a blast of air and blowing powder into the hole, then blowing sand against the powder, then
60 withdrawing the tube and filling the remainder of the hole with earth, substantially as described.

4. A device for charging powder comprising, in combination, a blower, a rigid
70 tube connected to said blower, and a powder receptacle, said receptacle being so arranged that sparks are kept from contact with the powder, substantially as described.

5. A device of the class described comprising, in combination, a blower, a rigid
75 tube adapted to project into an opening, a flexible tube connecting said rigid tube to said blower, and a powder can shield, substantially as described.

6. A device of the class described comprising, in combination, a blower, flexible and rigid tubes connected to said blower, a shield associated with said blower, said
80 shield being adapted to receive a powder can and provide sealing means whereby sparks are prevented from contacting powder in said can, substantially as described.

7. A device of the class described comprising, in combination, blowing means, a
90 rigid tube connected to said blowing means and adapted to project into an opening, and a powder can shield removably secured to the conduit between said blowing means and said rigid tube, substantially as described.

8. A device of the class described, comprising a container having an imperforate top wall and a downwardly and inwardly flaring bottom wall terminating in a spout, said walls being joined by a wall having an
100 opening therein, substantially as described.

9. A device of the class described, comprising a container having an imperforate top wall and a downwardly and inwardly flaring bottom wall terminating in a spout, said walls being joined by a wall having an opening therein, all of said walls being composed of a material which will not strike
105 a spark, substantially as described.

WILLIAM H. PLUMMER.
JOHN TRESIDER.

Witnesses:

L. R. ARLICH,
EDW. E. BARNIDGE.