

# UNITED STATES PATENT OFFICE.

NIRUM CADWALLADER, OF BIRCHVILLE, CALIFORNIA.

## IMPROVED METHOD OF BLASTING.

Specification forming part of Letters Patent No. 55,055, dated May 29, 1866.

*To all whom it may concern:*

Be it known that I, NIRUM CADWALLADER, of Birchville, county of Nevada, State of California, have invented or discovered a certain new and useful Process for Blasting by the use of Compressed Air; and I do hereby declare that the following description is sufficient to enable any person skilled in the art to make use of my said process without further invention or experiment.

The nature of my invention or discovery consists in the employment of compressed air as an auxiliary to gunpowder and other explosive material used for blasting, the air being forced into the cavity or chamber in which the explosive material is placed, or, when confined in chambers contiguous to it, to be let off at the instant of the explosion.

For the carrying my discovery into practical effect it may be illustrated by describing the operation of blasting in cement, gravel, and rocks found in hydraulic mining, as follows, to wit: I excavate the tunnel in the bank or rock, drifting and cutting with cross-T's to make necessary chambers for the powder, (which may be confined in boxes or cases, instead of in kegs, to prevent accident or dampness,) or any other well-known method may be employed where large blasts are to be let off. I take about one-half of the quantity of powder ordinarily used, which is placed in the chambers in the usual way, to be ignited by a safety-fuse. The pipe or hose necessary to introduce the air are then placed in the tunnel or drift, after which the entrance is well tamped and the air forced in by means of a common air-pump to the pressure desired, (two atmospheres may be considered sufficient in ordinary cases,) after which the blast may be let off.

Should it be found convenient the compressed air may be confined in a separate chamber and be let off simultaneously with or by the explosion of the charge. I prefer the former, as it seems to me to be the most convenient for ordinary blasting.

Should the earth in the tunnel or drift be found porous or seamy, rendering it difficult to retain the air sufficiently long to obtain the required pressure, the walls may be cemented or lined with any material of sufficient compactness to prevent the escape of the air.

I do not assert, broadly, that one-half of the usual quantity of powder will be saved by my process, but a great saving is had, and the explosive effect of the combustible material will be greatly heightened by the natural expansion of the compressed air itself as well as the great elasticity of the atmosphere, caused by the generation of gases formed and converted by the heat of the explosion; also, a greater and more complete combustion will take place, and a cheaper and more deteriorated article of powder may be used than in the ordinary way of blasting without the aid of compressed air.

Having thus described my new process for blasting, what I claim, and desire to secure by Letters Patent, is—

The use of compressed air in combination with all explosive substances for the purpose of increasing the explosive force of said substances by the aid of a greater amount of oxygen, and assisting by the force of pressure, as well as by the expansion of the air from the heat generated by the explosion, said compressed air to be confined in the chamber with the explosive material, or, when in a chamber or recess contiguous to it, to be let free at the time the explosion takes place, substantially as described, and for the purpose set forth.

In witness whereof I have hereunto set my hand and seal this 20th day of January, 1866.

NIRUM CADWALLADER. [L. S.]

Witnesses:

C. W. M. SMITH,  
GUS. A. MANTHEY.