UNITED STATES PATENT OFFICE.

PRUDENCIO CASTELLANOS, OF SAN FRANCISCO, CALIFORNIA.

IMPROVEMENT IN BLASTING-CARTRIDGES.

Specification forming part of Letters Patent No. **193,484**, dated July 24, 1877; application filed December 19, 1876.

To all whom it may concern:

Be it known that I, PRUDENCIO CASTELLANOS, of the city and county of San Francisco, State of California, have invented a new and useful Improvement in Cartridges for Blasting, which improvement is fully set forth in the following specification.

This invention relates to a new improvement in the manufacture of paper cartridges, such as contain hygrometric powder to load bore-holes.

The object of this improvement is to protect the cartridge against the injurious influence of dampness, in order to impede the decomposition and damage of the powder; and consists of a covering of tin paper, applied externally to the before-mentioned cartridges by means of some gluey substance. The tin paper is protected against injury resulting from contact with other substances by another covering of ordinary paper, which envelopes it.

The improved cartridges, filled with powder containing nitrate of sodium or any other hygrometric ingredient, are very effective in their explosion, even if used after having been exposed to dampness; and when this powder contains nitro-glycerine, like the giant powder No. 2, the cartridges are not dangerous, as are the ordinary ones, which have been the cause of many grave accidents under certain circumstances, which it is important to mention. The dampness of the atmosphere, penetrating the powder through the cartridge, is absorbed by the nitrate of sodium or by the nitrate of potassium which it contains, and a corresponding quantity of the nitro-glycerine is dislodged from the composition, and, infiltrating itself in the juncture of the paper, is retained in a liquid state amidst its paper envelopings. The cartridge in this condition is evidently dangerous; but the danger is augmented if the powder dries in consequence of a change in the state of the atmosphere, for in that case it becomes very hard, and serves as an anvil to facilitate the explosion of the nitro-glycerine by any casual shock.

The improved cartridges have also several advantages over the metallic ones, in being cheaper, lighter, and not rendered dangerous by the contact of fire, as are the latter when they are filled with nitro-glycerine powder.

I claim as my invention—

The improvement in paper cartridges containing hygrometric mining-powder, the same improvement consisting in an outside tin-paper covering, which is again enveloped in common paper, applied to the cartridges in order to make them impermeable to dampness, substantially as and for the purpose specified.

PRUDENCIO CASTELLANOS.

Witnesses:

M. J. AQUIRRE,

I. DE URIOSTE.