(No Model.)

G. S. DEAN.

TESTER FOR EXPLOSIVES.

No. 253,914. Patented Feb. 21, 1882.

Fig. 1

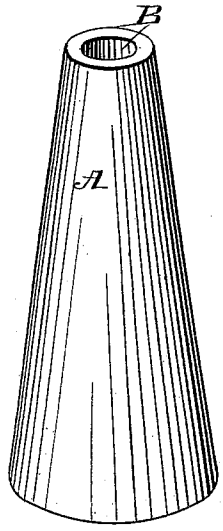
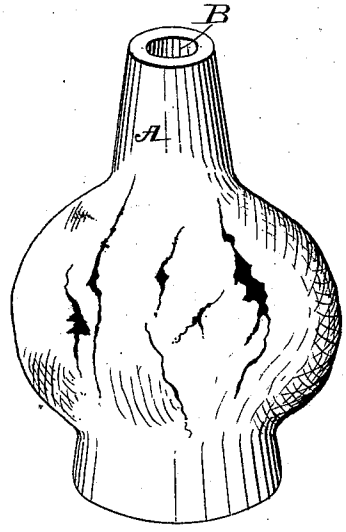


Fig. 2.



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UNITED STATES PATENT OFFICE.

GILBERT S. DEAN, OF SAN FRANCISCO, CALIFORNIA.

TESTER FOR EXPLOSIVES.

SPECIFICATION forming part of Letters Patent No. 253,914, dated February 21, 1882.

Application filed June 24, 1881. (No model.)

To all whom it may concern:

Be it known that I, GILBERT S. DEAN, of the city and county of San Francisco, State of California, have invented a Tester for Explosives; and I hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to a method for testing the force of explosives for blasting purposes; and it consists in a receptacle having a predetermined resistance to explosive strains, made of lead or similar tough inelastic substance, having a bore or blast hole extending a sufficient distance into the artificial rock to permit of the introduction of the explosive, and of a tamping of sand or other material, so that a charge of any explosive, when properly tamped into the tester and fired, shall expand the tester in proportion to the strength of the explosive.

The design of the invention is to imitate the operations of the blaster—that is, to construct an artificial rock, to have in that rock a blast-hole, to load that blast-hole with powder, tamp it, and fire the blast in the same way as is done in actual work. The artificial rock is made of a tough inelastic substance, partly to prevent danger from flying pieces, but principally that there may remain in the expansion of the lead a record of the work done—that is, of the power or value of the explosive.

The invention is manifestly not intended to test powders designed for fire-arms, (for there it is not breaking-power, but throwing force, which is wanted;) but it is intended simply to test mining-powders to find the blasting force of different compounds.

Referring to the accompanying drawings for a more complete explanation of my invention, Figure 1 is a view of my device. Fig. 2 shows one exploded.

A is the artificial rock, of lead or similar material. B is the blast-hole into which the explosive is introduced, which is to be tamped or otherwise treated as a blast-hole would be in actual work.

In order to test the relative force of explosives, a number of these artificial rocks are made. The artificial rocks or testers are all cast of the same material, which should be uniform or homogeneous in texture, and all the testers must be of the same size and shape, and with a hole, B, of the same dimensions. This uniformity of size may be secured by using an iron mold, within which all the testers should be cast. The hole B is similar to a drill-hole which is bored by miners for blasting purposes, and is best formed by a pin placed in the mold. The best form for the artificial rock is that of a truncated cone with the blast-hole extending from the smaller end well down toward the base of the cone. The walls must be thick enough to withstand small charges of the explosives to be tested. I have found a suitable size to be—length eight inches; diameter at base three and a half inches; at the top one and a half inch; depth of hole six inches; diameter of hole at bottom five-eighths of an inch. The hole may have sufficient taper to allow the pin which forms the bore to be readily drawn after casting. For weak explosives a larger bore-hole may be advantageously used. The melted lead should of course be poured all at once into the mold, that the tester may be solid and homogeneous, without flaws or weak spots. In this manner I produce a series of blocks which will offer a uniform resistance to any explosive force, and in which any explosive which will always produce a constant result will record that result in a certain definite manner, and will produce an expansion proportional to the strength or blasting force of the compound.

There are two methods of testing explosives with this device. The first consists in firing equal charges of the powders or other explosives to be tested, making the charges so small that they shall not burst the testers. After the shots the largest circumference of the testers is taken, and this will give an indication of the relative strength of the explosives. It is to be understood that the artificial rocks should be loaded, tamped, and prepared in the same way as is done with real rocks in actual blasting.

The second method gives accurately the comparative blasting force of different explosives, and consists in finding by the method just indicated the expansion caused by firing a given quantity of one explosive and then determining by experiment the quantity of the second explosive necessary to produce the same result.

Many other interesting questions are answered by this testing device—*e. g.*, the effect produced by rigid explosives which do not fill the bore, the effect of different kinds of tamping, and similar matters. I have found that when equal charges of any homogeneous or even explosives are fired within these cones the effect upon the cones will always be alike, and they will be expanded, torn, or disrupted in so nearly the same manner in every case that the difference of a few grains of the explosive will show a perceptible difference in the result. This enables me to make tests of the greatest exactness with different powders, or with different qualities of the same powder.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

The method herein described for testing the blasting force of explosives, consisting in inclosing them in conical lead or other vessels having a predetermined resistance to a fracturing strain, tamping the charge, and exploding it, whereby the altered shape and condition of the vessel indicates and registers the force of the explosive charge, substantially as set forth.

In witnesss whereof I have hereunto set my hand.

GILBERT S. DEAN.

Witnesses:
S. H. NOURSE,
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