

EXPLOSIVES.

The following article is from a paper read before the Australian Institute of Mining Engineers, by Mr. J. R. Godfrey, A.I.M.E., on "Safety Appliances and Precautions Necessary in Mines." The character of this portion of the article quoted is sufficiently important to be interesting and valuable to those using explosives :

In spite of the quantity of explosives used in mining, in spite of the special instructions issued with every packet, in spite of the lessons taught by former accidents, it is a sad truth that injuries from dynamite and its kindred explosives continue to furnish about one-third of the total number of accidents for the year.

Nitro-glycerine and other high explosives are not dangerous so much by themselves and under normal conditions, as from the fact that they have to be exploded by percussion, by means of a detonator containing fulminate of mercury, which is a very sensitive medium. We have, therefore, these rules :

Never keep dynamite in the same box as the detonators.

Never clean a detonator with a hard substance, such as a pin, or even a straw, merely shake the sawdust out.

Never bite the cap on to the fuse, but use a pair of pliers.

When using powder, it is necessary to tamp very tightly, hence copper bars are allowed; iron bars being prohibited as they omit sparks when struck on the side of the holes.

Many miners still cling to the superstition that dynamite must be tamped like powder, and, therefore, use a copper bar. This should be prohibited, it is not necessary, and is very dangerous, for if the bar slipped out of the man's hand when pushing the primer home, its falling weight is quite sufficient to explode the detonator. Hardwood sticks are all that are required and all that are permissible.

In all large mines, the dynamite stored underground should be placed in a specially constructed magazine, under the charge of one man. The detonators being in separate boxes well apart; and a locked and cased lamp kept constantly burning; anyone taking a naked light into the magazine should be dismissed, for if dynamite catches fire and burns away instead of exploding, it generates excessive quantities of carbonic acid gas, and carbon monoxide—the one asphyxiates, the other is a deadly blood poison; and it may destroy every man in the level.

Proper cases should be supplied for carrying the dynamite from the magazine to the working places, and contractors' boxes should have a separate compartment for the explosive, the detonators, and the fuse, and be provided with a strong hinged lid.

In charging holes underground, explosives should never be mixed; it is absolutely useless since the quicker explosive will do the work, and it may be dangerous by setting up chemical reactions and generating deadly gases, which would not be formed in excessive quantities by the one explosive. Never drill out missed holes, never go back to missed charges until some time has elapsed and never drill into old sockets, as a plug may only partially explode, or may coat the hole with a layer of active explosive. Neglect of these simple and obvious rules has erected a city of tombstones over the bodies of the hapless and foolish victims.

When firing holes, all approaches to the place should be carefully guarded to prevent anyone from inadvertently approaching.

When firing charges there are three methods adopted—by snuffs, by matches, and by spitting the fuse. The most common and most dangerous is to spit the fuse; even the best fuses may have a bad coil; occasionally where the powder is unevenly laid, the fuse will then "run" and explode the charge prematurely. The usual speed of a fuse is two feet a minute, but the writer has known an individual coil, by one of the most reliable makers, run through five feet in 25 seconds; hence spitting is dangerous, as a man has no time to escape should the fuse begin to crackle, a sure sign that it is running.

It is becoming very common to spit a fuse with dynamite. The end of the fuse is split with a knife, and a piece of dynamite the size of a pea placed in this slit; the dynamite is then lighted, and ignites the fuse. Some day the dynamite will explode, temporarily or permanently blind the man, and while he is groping about to find his way out, the charge will explode and he will pay the full penalty for his temerity.

Firing with a match is done by splitting the end of the fuse, inserting the head of the match and lighting the other end, this gives nearly three-quarters of a minute extra time.

The best plan is to use a candle snuff; each fuse has a snuff placed under it, the miner lights them, and can retire to some safe place and wait until the fuse burns through and spits. As soon as he sees they have all spitted he can go away and there is no danger; yet in spite of all this, and for the sake of saving two or three seconds, men will frequently juggle with their lives.

In firing in shafts it should be compulsory to fire with electric discharge. A man never knows what may go wrong with the engine, windlass, or ladders—if he lights his fuses, and anything should go wrong, he is like a rat in a trap, with no escape. In firing by electricity the battery is never connected until all the men are out of the shaft, and there can be no danger; it is also far more efficient.

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