The....
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## Selected Questions and Answers.

### Safety Lamps.

Q.—Describe some suitable means of locking a safety lamp.

A.—It should be so arranged that it cannot be undone, except by the proper official by the means he is empowered to use, and at the same time he should be able to detect any signs of tampering with the lamp. There have been many clever devices brought out to fulfil this purpose.

The older lamps having a locking arrangement in which, when the vessel of the lamp is screwed into the lamp, a small screw is turned until it so tightens itself on the vessel that it cannot be undone without the screw being released.

There is a fault about this, that is, in time the screw cuts into the vessel of the lamp, and makes a hole in it by frequent screwing up.

Another means of locking is by aid of lead rivets being passed through a hole to prevent the lamp being undone, (the system that is in vogue at the Springhill collieries.) I will later explain this.

Amongst the more recent patents is one which is pneumatically locked, and cannot be undone without the machine as in the Cambrian lamp.

There are also the lamps which, when unlocked, or rather when attempting to turn the screw to undo the lamp it engages a pricker which draws the flame down and extinguishes the flames when the screw is turned. Thus, before the lamp can be really undone the light has been put out. At the present time, however, we know that we must pay for new ideas, and at the same time we have to use strict economy.

Therefore the one I should adopt would be the means of locking by lead rivets.

It is generally known that the vessel is screwed into the frame of the lamp, and the lamp is locked by the aid of some other arrangement when the vessel is screwed home.

In the arrangement I wish to describe, an eye-piece is brazed on to the vessel, and on the frame another hinged eye-piece is so placed as to fold over the eye-piece on the vessel, when the vessel is screwed up. It resembles very much the fastening of a powder canister, or old fashioned tin trunk.

When the hinged eye-piece is folded over, the eye-piece on the vessel is ready to receive a padlock, or in this case a lead rivet.

This lead rivet must be made and riveted in such a manner that it will show any signs of tampering, and to produce this means on one side a properly rounded head is formed as in the ordinary rivet, and when the other end is required to be secured it is done by means of a pair of pliers.

To detect this tampering a monogram is generally raised on one side of the pliers, so as to leave an impression when the rivet is sealed up. If the rivet is tampered with the monogram impressed on it is defaced, and must be destroyed to pull out the rivet.

To enable re-lighting the proper official carries a few of these rivets in his pocket, also a pair of pliers which will impress the monogram.

To undo the lamp a rivet is broken off, and when locking up a new rivet is placed in and sealed up by means of these pliers.

When the lamps are returned to the lamp station the rivets are broken off, and new ones placed in next time. These old rivets can be remoulded when heated, and thus made use of again. I have seen this system work with good effect.

The workmen know very well that they cannot undo the lamp without being found out, so this renders it very safe.

It is one careless workman that endangers his fellow workmen's lives, and therefore we must adopt some arrangement in which the locking arrangement cannot be tampered with without detection, and if this tampering is proved the man ought to be severely dealt with.

### Spontaneous Combustion.

Q.—What is spontaneous combustion? What do you consider the chief agents which produce it?

A.—Spontaneous combustion is the condition when anything takes fire without the existence of some pre-existing fire (such as a torch or match) It is a frequent occurrence in some mines. Some of the chief agents which produce it are:—(1) Oxidation of the small coals, (2) pressure, (3) artificial heat, (4) iron pyrites.

Oxidation of small coal.—It is now considered that this is the chief factor in producing spontaneous combustion. Wherever there is a heap of small coal lying, the internal part of this heap absorbs the oxygen from air. This generates heat, which is prevented from escaping by the coal on the outside of the heap. This process of oxidation goes on, until the heat rises to such a temperature that it extends from the inside to the outside of the heap; it then meets with greater quantities of air, and combustion can take place freely, when it will burst out into a flame.

Pressure.—Where pillars of coal are left standing over long periods they become subjected to excessive pressure. As the pressure begins to