“ grille ” as well as a door, so that the Contents may be protected by the gate during business hours without preventing the free access of air; they are usually also fitted for convenient sub- division. Safe deposit vaults do not differ in any way from strong-rooms, except that they are fitted up with small safes or *integers* provided with special locks, so that the renter can gain access to his own integer only, and this only with the assistance of a custodian.

Many electrical devices have been introduced, having for their object the giving of an alarm when strong-rooms or safes are im­properly approached or tampered with. Most of these devices were quite useless, as they could at once be rendered inoperative; but though others displayed greater ingenuity, it is very questionable whether they are of any real utility, and they have not remained in common use. Where the value known to be contained in a strong- room is sufficiently great, an attack by tunnelling must be specially guarded against, and as in this form of attack the time which may be devoted to preparing for the actual breaking through is practically unlimited, the use of some device which will give warning of any such attack before the floor of the strong-room itself is reached is of very great importance. Probably the best of such devices, and one which is in practical use, consists of a network of small pipes, laid in concrete below the floor, and filled with glycerin or other liquid. To this network a mercury manometer is connected. If any breach is made in the pipe system, a leakage takes place, causing an alteration in the level of the mercury in the manometer, which may, if desired, be arranged to ring a bell. The manometer should in any case be observed regularly on the opening of the strong­room. (A. B. Ch.)

SAFETY-LAMP, a form of lamp, used especially in mines, which is so constructed that it will burn without igniting a gaseous explosive mixture by which it is surrounded. To effect this end, the flame is encircled with a protecting metal case which is perforated with numerous small holes. Through these air for feeding the flame can enter freely and the products of combustion escape; but the flame or gases cannot pass out at a sufficiently high temperature to cause the ignition of the explosive mixture outside, because on arriving at the perforations they give up much of their heat to the large metallic surface they encounter, by which it is conducted away. In 1816 Sir Humphry Davy discovered the suitability of wire gauze as the material of the metal case, when the substance of the wire was rightly proportioned to the size of the aperture. The standard adopted as the limit for safety at that time was a gauze of 28 iron wires to the linear inch, having 784 apertures per square inch, but in some lamps the apertures are occasionally made still smaller.

The common safety or Davy lamp consists of a small cylindrical oil lamp, covered with a cylinder of wire gauze about 6 in. long and 11/2 in. in diameter, with a flat gauze top. The upper part of the gauze is doubled to prevent it from being worn into holes by the products of combustion, and the air for feeding the flame enters round the wick. The gauze is mounted in a cage, consisting of three upright wires, screwed into a flat brass ring at each end. A handle is attached to the upper ring, while the lower one screws on to a collar on the oil-vessel of the lamp. When the two parts are screwed together the lamp is locked by a bolt passing through both parts, which is screwed down flush with or below the surface of the outer ring, so that the gauze cannot be removed without the use of a key.

In Stephenson's safety-lamp, generally known as the “ Geordie ” from its inventor George Stephenson, the light is covered by a glass chimney, surrounded by an outer casing and top of wire gauze. The feed air is admitted through numerous small holes in a copper ring a little below the level of the wick. This is one of the safest forms of lamp, but requires considerable care in use, especially in keeping the small feed holes clear from dust and oil; the glass protects the gauze from becoming overheated, and when the air is dangerously charged with gas the light is extinguished.

In the lamp invented by Dr W. Reid Clanny (1776-1850) about the same time as those of Davy and Stephenson, a glass cylinder is substituted for the lower portion of the wire gauze. The air for supplying the flame, entering at the bottom of the gauze and passing down the inner side of the glass, protects the latter to some extent from becoming overheated, but a large amount of light is lost by absorption in the glass, so that there is no great advantage over the ordinary Davy lamp to compensate for the extra weight and cost, especially as the safety property of the lamp depends upon the glass cylinder, which may be readily broken when subjected to the ordinary accidents of working. A more perfect form of lamp of the same character is that of Mueseler, which is extensively used in Belgium. It differs from Clanny’s lamp by the addition of a conical chimney above the flame, which produces a rapid draught, and consequently a more perfect cooling of the glass cylinder by the downflow of feed air for the flame.

The safety of the Davy lamp is endangered by exposure to a current of gas moving at more than 6 ft. a second, as the flame is then liable to be forced through the gauze, and the Clanrty and Stephenson lamps are not safe in currents exceeding 8 and 10 ft. respectively. These early forms have therefore been improved and modified to meet the requirements of safety in air-currents travelling at a high velocity. In the Hepplewhite-Gray lamp there is a conical glass surrounding the light, with a gauze chimney, pro- tected by an outer metal cylinder; the air supply to the flame is carried downwards through three tubes forming the standards of the cage. This lamp, in addition to giving a good light overhead owing to the shape of the glass, is peculiarly sensitive to gas, and therefore valuable in testing for fire-damp. Other approved lamps arc the Deflector and those of Marsaut and Mueseler when specially bonneted to resist extra high-speed currents. The illuminant now generally used in Great Britain is a mixture of rape oil with half its volume or more of petroleum, which is more suitable than vegetable or animal oil alone. In Germany, and also in America, Wolf’s lamp, burning benzoline or petroleum spirit upon an asbestos wick, is very popular as giving a much better light than oil. Special care is, however, required in filling, so that no free liquid may be left in the holder; the spirit must be entirely absorbed by a filling of sponge, and any superfluous quantity poured off. Portable electric lamps, supplied by accumulators or dry batteries, have been introduced into coal-mines; but owing to the weight and cost their use is as yet very restricted.

The ordinary safety-lamp affords indications of the presence of fire-damp (marsh gas) in the air of a mine. When the amount exceeds 2 or 21/2%, it may be detected by reducing the flame till it is practically non-lumionous, when a pale blue flame or luminous cap will be seen above the ordinary flame. This varies in size with the percentage of fire-damp, until when there is about 10% the blue flame fills the whole interior of the gauze cylinder. If the lamp is allowed to remain too long in such a fiery atmosphere, it becomes dangerous, because the gauze, becoming heated to redness, may fire the external gas. For detecting the presence of fire-damp in amounts less than 21/2 %, special lamps with non-luminous flames are adopted. In Pieler’s lamp, which is of the ordinary Davy form, alcohol is burned on a silk wick, and a screen is provided so that the flame can be hidden. When exposed in air containing 1/4 % a cap of 1⅜ in. is formed, which increases to 2 in. with 1/2 %, and with 11/4 % the lamp is filled with a deep blue glow. Another and more useful method is that of Dr F. Clowes, who uses a hydrogen flame o∙4 in. long, obtained by attaching a cylinder containing compressed hydrogen to an ordinary safety-lamp. When used for gas testing the hydrogen is turned into the oil flame, which is for the time ex­tinguished, and relighted when the observation is finished. So small a proportion as o∙2 % of gas can be detected by this method.

The locking of safety-lamps, so as to render them incapable of being opened by the miners when at work, is a point that has given play to a large amount of ingenuity. One of the most favourite devices is a combination of the wick-holder with the locking bolt, so that the latter cannot be withdrawn without lowering the wick and extinguishing the flame. Another method consists in the use of a lead rivet, uniting the two parts of the lamp, impressed with a seal, which cannot be removed without defacing the device. All this class of contrivances have the defect of only being efficacious when the miners are not provided with matches or other means of obtaining a light. A more physically perfect method is that adopted by Bidder, where the locking bolt is magnetized and held in place by a force which can only be overcome by the application of a battery of heavy and powerful steel magnets. These are kept in the lamp cabin at the pit bottom, where the lamps are cleaned and served out lighted to the miners at the commencement of the shift, and are collected before they return to the çurface. (H. B.)

§AFFÃRIDS, a Persian dynasty of the 9th century, founded by Yakub (Yaqub) b. Laith b. Saffär (“ coppersmith ”) about 866, who, originally a leader of bandits and outlaws, became governor of Sejistan. He soon added to his province Herat, Fars, Balkh and Tokharistan, overthrew the Tahirids in Khorasan, and, nominally still dependent on the caliphs of Bagdad, estab- lished a dynasty in Sejistan (see Caliphate, section C, *Abbasids,* § 10, and Persia: *History,* section B). Soon after 900 the dynasty became subordinate to the Sāmānids (*q.v.*) and few of its rulers had any real authority. Under the last of the dynasty, Taj ud-din Binaltagin (1225-1229), a usurper of the royal family of the Khwarizm shahs, the country was captured by the Mongols.

See S. Lane Poole, *Mahommedan Dynasties* (1894), p. 129; Stockvis, *Manuel d'histoire* (Leiden, 1888), vol. i. p. 137; on the later Ṣaffārids, H. Sauvaire, in the *Numismatic Chronicle* (1881).

SAFFI, or Asfi, a seaport on the west coast of Morocco, in 32° 20'N. 9° 12' W., 106 m. W.N.W. of Marrãkesh. (Pop. about 15,000.) Although the principal wool and grain port of central Morocco, the anchorage is an open roadstead and communica­tion with the shore is at times difficult. The old palace with