drilling, by the use of explosives, and by the use of wedges and similar well-known tools. This Corliss safe consists of a spherical shell of cast iron several inches thick and with its exterior hardened by “chilling.” It is fitted with a ground-in door rotat­ing concentrically with the shell and internally. The spherical form and great thickness render the useful space in the interior very small and of inconvenient shape.

The requirements of a modem safe may be briefly summarized.

In fire- and thief-proof safes, the body and door must be constructed of sufficient thickness, and the joints as well as the attachment of the door to the body frame of sufficient strength, to remain uninjured by a fall from the highest position in which the safe may be placed to the basement, or by the impact of any debris, coping stones, girders, &c., falling from the highest part of the building to the basement. The space between the outer body and the inner casing must be properly charged with a steam-generating mixture in sufficient quantity to keep the interior of the safe moist for the whole time during which it may be subjected to heat in the case of a fire. The same requirements must be satisfied in burglar-proof safes. In addition, the body and door must be of such material and of such thickness that it is impossible to cut a sufficiently large hole to extract the contents, and so constructed that they can- not be dismembered; the framing and attachment of the bolts to the door must be able to resist the action of wedges or forcing screws; the vital parts of the lock and bolt- work must be further protected so that it is impossible to attack them by drilling; and this protection must not be liable to be destroyed by the action of heat; the lock itself must not be capable of having its security destroyed by the explosion of the largest quantity of explosive which can be inserted. If these conditions are satisfied there is little fear that the oxy-acetylene blowpipe, the elec- tric arc or the use of the higher explosives can be made effective. The amount of protection required to meet the above conditions must, in each case, depend on what tools it is reasonable to anticipate may be employed by the burglar and the maximum time which he may have at his disposal. The use of high explosives has become a more frequent method of attack by burglars in Great Britain, but where the safes have been of the best quality, of solid construction and good work- manship, this means of attack has been rendered ineffective.

*Strong-rooms and Vaults.—*It is not hard to imagine that the use of strong-rooms was much earlier than that of safes; in fact, there can be no doubt that masonry rooms provided with heavy wooden doors secured by locks were in use in ancient Egypt, and that the development of strong-room doors attached to masonry rooms followed that of the old coffers very closely. No exact date can be obtained as to the introduction of what we may call modern strong-rooms, but it is only reasonable to suppose that, where larger quantities of valuables had to be preserved than a safe would conveniently hold, a safe-door of larger dimensions

would be made and attached to a masonry or brick room. The next step would be the discovery that the walls of such a room offered little protection against even unskilled violence, and the lining of the room with metal would immediately follow; the door frame, as a matter of course, being attached to the plating. Strong-rooms of this construction are in common use to-day by

banks and other institutions; and, as with safes, so with strong­rooms, development has taken place in the direction of increasing the thickness and the structural strength as well as in the applica­tion of superior locking devices (see Locks).

This increase of structural strength has been carried along somewhat different lines by different makers in Great Britain and along still more diverse lines in America. Masonry or brick­work alone is now rarely relied on for the protection of goods of any great value; concrete, however, reinforced by old railway metals imbedded therein and sometimes connected together to form, as it were, a cage, is in use. Railway metals attached to steel plates and also bedded in concrete arc very largely employed. Thick plates of steel and latterly of manganese and other special steels are also in common use. Various forms of strong-room walls are illustrated in fig. 6.

Usually a strong-room is provided with an open-work gate or