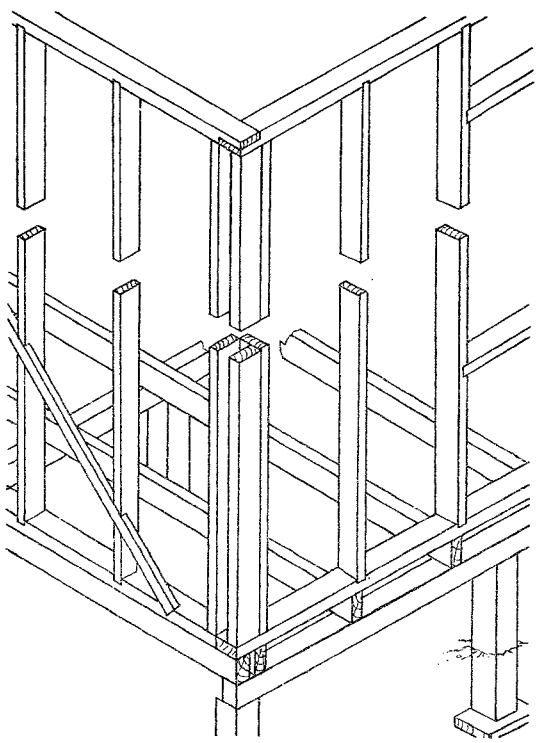
BUILDING CONSTRUCTION NOTES FOR SUBS. INSTALLATION.

TIMBER FRAMED DWELLINGS:-

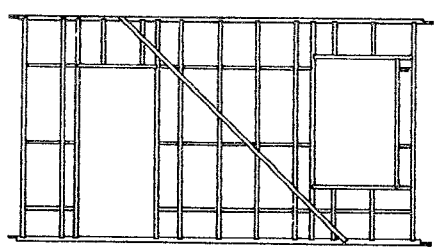


TIMBER FRAMING

STUMPS AND SOLE PLATE:-
The structure has as a basis, brick footings, or redgum or jarrah stumps fitted with a 9" to 12"x6"x1-1/2" redgum or jarrah soleplate.
These are set in the ground to give a minimum clearance of 9" between the ground and the top of the stump, and are spaced at a maximum of 4' along the bearers and at 4' to 6' along the other face.
Avoid driving an earth pipe beside a stump as it will disturb the sole plate.

BEARERS:-
The bearers take the weight of the structure and are of 4"x3" timber, usually hardwood on edge.

JOISTS:-
The joists consist of 4"x2" timber, usually hardwood, and serve as a base for the walls as well as to take the flooring. They are fixed at right angles across the bearers at 1'6" centres, except at external and partition walls where double joists are used. These are spaced 1" apart at external walls, and 2" apart at partition walls to allow support for wall framing and as a fixing surface for floorboards.
The framework of bearers and joists provides a ready means of cable fixing providing underfloor access is available.
Staple the cable along the side of bearer and joist. Do not run the cable diagonally. Room access in this case may be through the flooring and up the skirting board or in the case of a timber framed dwelling, by boring through the wall plate and "fishing" the cable up the wall cavity.



TIMBER FRAMING

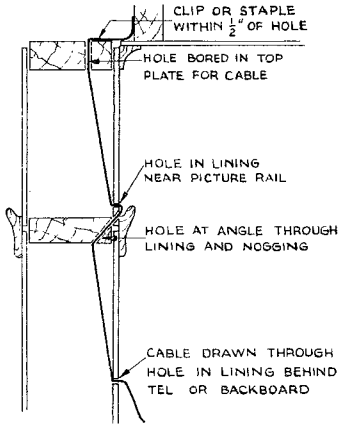
WALL FRAMING:-

The wall frames consist of a top and bottom plate of 4"x2" timber, into which are checked the studs at 18" centres. Common studs are usually 4"x1-1/2" and door and window studs are 4"x2".

The wall frames are prevented from going out of square by the fitting of braces, usually of 2" or 3"x1" timber, checked into the studs at an angle of approximately 45 degrees.

NOGGINGS:-

Noggins consist of 4"x2" or 4"x1-1/2" scrap from studs etc., nailed between the studs to prevent the bowing of the studs with the weight of the roof construction, and to serve with the studs as fixing points for the wall covering material. Noggins are usually nailed on



CONCEALED WIRING
TIMBER FRAMED WALL

the flat, but where plaster sheets are flush jointed at picture rail height, they may be on edge. In this case cable access may be available in the wall cavity by boring through the top plate and dropping the cable down the wall cavity.

If noggins have been fitted on the flat, concealed wiring can be provided as shown in the sketch.

At the corners of the wall framing, three studs are usually provided. This allows corner fixing for interior and exterior wall coverings. Older type houses have a solid 4"×4" corner post in lieu of the present day method of three studs.

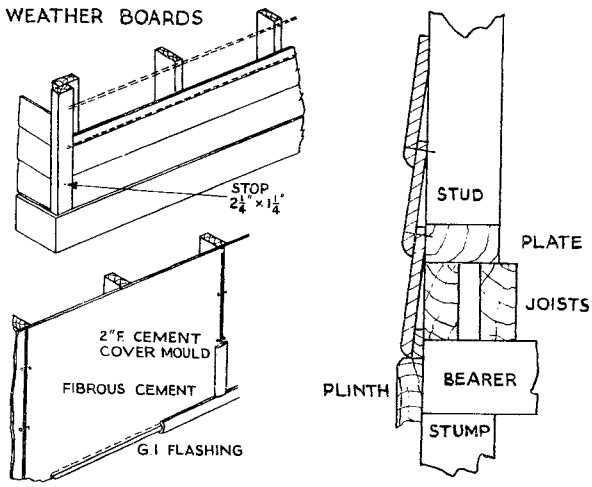
PREFABRICATED BUILDINGS:-

In some prefabricated buildings flooring is first laid on the joists to the outside edge, and the wall framing is then fixed on the top of the floor.

EXTERIOR WALL COVERINGS:-

WEATHERBOARDS are made in varying widths and may be of softwood or hardwood. They are nailed to the studs, usually horizontally.

If cable entry is to be made through the weatherboards always ensure that the hole is bored under the projecting lip of the adjacent weatherboard and is of a size to permit only a snug cable fit, and is drilled upwards to prevent the access of moisture into the dwelling.



OUTSIDE WALL COVERINGS

FIBRO' CEMENT OR SIMILAR SHEETING:-

This type of wall covering is nailed to the studs and noggins.

Vertical joints are butted on a stud, but horizontal joints are butted with a strip of galvanised iron flashing to prevent the access of moisture. Both types of joints are covered with cover moulding.

If cable entry is to be made, a twist drill must be used and extreme care must be exercised not to fracture these brittle sheets.

Cable entry must always be provided in such a position as to prevent the access of moisture.

PROTECTOR MOUNTING:-

Where possible mount protectors vertically with the line terminals uppermost, in a weather-proof position, and at sufficient height to be accessible but secure from interference.

INTERNAL WALL FACINGS IN TIMBER FRAMED DWELLINGS.

A variety of materials are used and these are nailed to the studs and noggins.

FIBROUS PLASTER is most commonly used and consists of sheets of Plaster of Paris base, reinforced with sisal fibre.

LATH AND PLASTER is found in older types of dwellings. This surface is formed by nailing 1"x3/8" laths, about 1/2" apart over the entire surface of walls and ceiling, then rendering with mortar so that the material is forced in between and around the edges of the laths, thus providing a key for the further rendering of the finishing plaster mixture.

Care must be taken in working on this type of wall as with age the lime mortar crumbles and large pieces can easily be dislodged.

On this type of wall do not fix any apparatus which is subject to mechanical movement, without first providing a backboard.

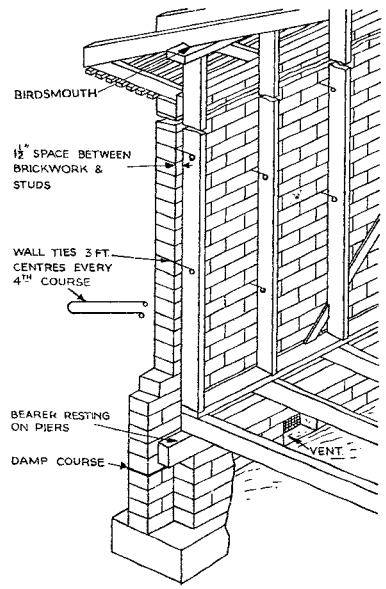
WALL BOARDS : Many types of proprietary lines are in common use, such as; CANEITE, MASONITE, WALL, and etc.

Occasionally cement sheeting is used for internal walls where moisture is likely to be present.

LOCATING STUDS.

When studs are to be used for the fixing of apparatus they can be located in the following ways -

(1) Observation along the wall surface against the light will usually enable the "stop" marks in the plaster to be located. These will show where clouts have been used to fix the plaster to the studs and noggins.
(2) Measurement from the nearest corner of the room, firstly 1", then at 18" centres will usually locate stud centres.
(3) Observation of nailing marks on wood trimmings will also disclose stud centres.
(4) If other methods fail, the sound produced by tapping lightly along the wall with a pencil or the back of the knuckles will determine the position of studs and noggins.



BRICK VENEER

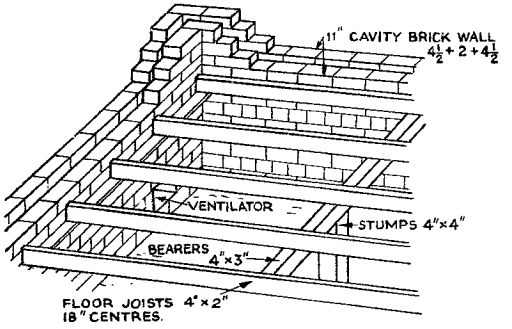
BRICK VENEER.

These dwellings are timber framed as previously outlined, with a single brick wall as outer covering, tied to the timber framing with G.I. wall ties. The wall foundation is of concrete with brick footings replacing the outer perimeter of stumps. A damp course between brick courses is provided below floor level, and ventilators are spaced at regular intervals around the walls, one series below floor level for under floor ventilation and the other series below ceiling level for room ventilation. These ventilators are a convenient means of cable entry to a dwelling, for either u/g cable or lead-ins from aerial lines. A 1-1/2" space clear of obstruction exists between the brick veneer and timber frame and cables can easily be dropped down or pulled up this cavity to be fished out through the internal wall covering at the desired height. Irrespective of the manner of entry into brick veneer and solid brick dwellings, care should be taken not to render the damp course ineffective.

BRICK DWELLINGS.

Most brick dwellings have cavity brick walls. Two brick walls are built independent of each other with a space of 2" between them. This cavity provides insulation from dampness, heat, cold, etc. The walls are tied together at intervals with G.I. wall ties. The width of a cavity brick wall is 4-1/2" plus 2" plus 4-1/2", making 11" without internal or external rendering.

As is the case with brick veneer dwellings, a damp course and ventilators are provided.



BRICK CONSTRUCTION

Factories, warehouses, etc., often use solid brick walls without cavities, sometimes using three thicknesses of bricks.

INTERNAL WALLS OF BRICK DWELLINGS, usually consist of single brick walls although TERRA-COTTA BRICKS - hollow bricks made from baked clay, and CINDCRETE or COKE BREEZE BLOCKS, a mixture of cement and coke - are often used in place of single brick walls.

Care must be taken to identify the wall material before mounting apparatus so that correct anchors and fixing methods may be used.

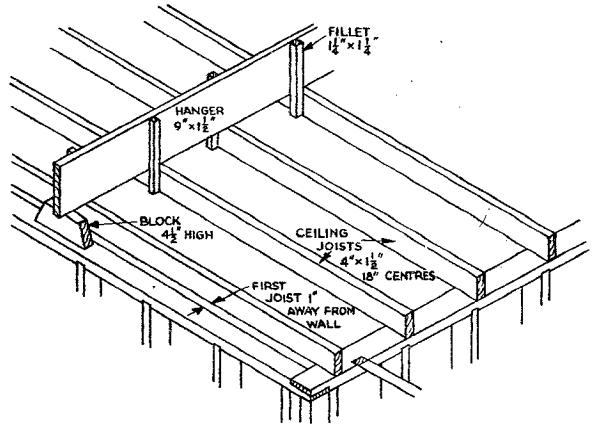
WALL FINISHES - Walls built of brick, reinforced concrete, terra-cotta, or cindcrete blocks are usually rendered with a covering of mortar and finished with a thin coating of plaster.

When fixing apparatus to brick or reinforced concrete walls always ensure that the wall anchors are of sufficient length to pass through the rendering, and expand in the wall fabric to ensure secure anchoring.

EXTERNAL WALL FACINGS - External wall surfaces are usually left without facings, although for appearance they may be painted or rendered with cement mortar.

STUCCO FACING is for decorative purposes and is applied after rendering a brick wall with cement, or lining a wall framing with laths, and then applying a cement rendering. A further application of cement or grout is then smoothed on with a straight edge to leave depressions or irregular patterns.

ROUGH CAST. Another form of facing, known as rough cast, is applied after first rendering the wall with cement as before, then a mixture of rough ashes or pebbles and cement is applied, leaving a raised uneven rough surface. Wherever possible, avoid working on stucco or rough cast facings, as it is often brittle and will easily flake off.



CEILING CONSTRUCTION

CEILING CONSTRUCTION.

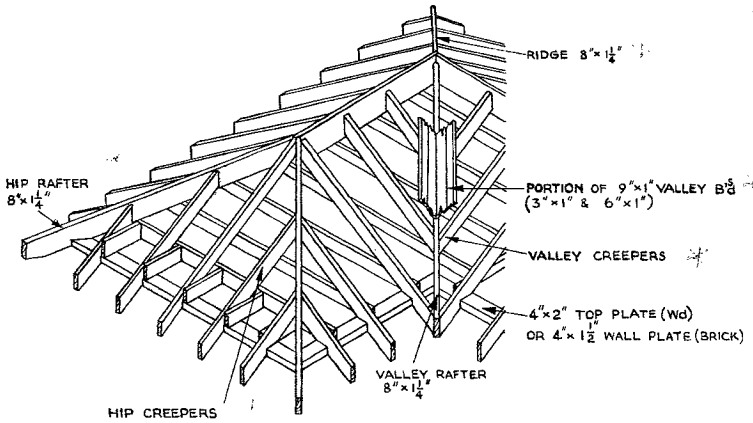
CEILING JOISTS of 4"×1-1/2" timber are laid in position at 18" centres, spanning the shortest distance across the room, and are nailed to the wall plates.

HANGER OR HANGING BEAM. This member is of 9"×1-1/2" timber and is placed on edge at right angles across the joists where the span exceeds 6 to 8 feet. The hanger gives support to the ceiling joists by the fitting of 1-1/4"×1-1/4" fillets, which are nailed to joist and hanger. Hoop iron strapping between joists and hanger is sometimes used instead of wooden fillets. When working on a ceiling, walk only on the ceiling joists and never at any time place weight on the ceiling lining.

When cabling or wiring in a ceiling, staple the cable to the side of hanger or joist according to the direction of the cable run. Do not staple or lay the cable across the tops of ceiling joists or hangers in such a position that it can later be damaged by being walked on. Run the cable at least two inches away from any electric power conduit or wiring.

ROOF CONSTRUCTION.

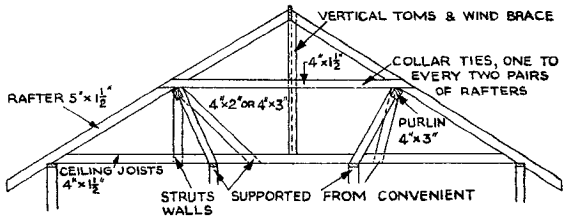
The term roof describes the part of a structure intended to cover and give protection to the lower part of the building. Timber is the most commonly used material for the framework in the construction of residential roofs.



PARTS OF A ROOF

COMMON RAFTERS are the roof timbers which form the principal framework of the slopes of the roof. They support the battens etc., which carry the roof covering. The common rafters run from wall plate to ridge. Other types of rafters are :-

CREEPERS - the diminishing rafters cutting against hip or valley.
HIP RAFTERS - are diagonal members running from the corner of the top plate to the end of the ridge.
VALLEY RAFTERS - are diagonal members on an internal angle.
RIDGE - the ridge is the length of timber at the apex of the roof where common rafters butt together.
ROOF BATTENS - are fitted across the rafters at centres suitable for the roofing material, which may be galvanised iron, tiles, asbestos cement etc.



ROOF CONSTRUCTION

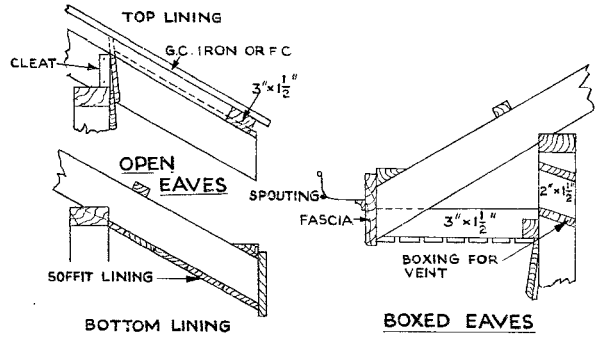
PURLINS are fitted to the under side of the rafters and are supported by STRUTS which run between the purlin and a convenient wall.
These form a convenient means of cabling from one side of the building to the other by stapling the cable up the strut and along the purlin.
COLLAR TIES are used to connect two opposite rafters together near their centres and for convenience usually rest on the purlins.
TOMS - are struts from wall plate to ridge.

ROOF COVERINGS.

A variety of roof coverings are used. Some of these are, terra-cotta tile, galvanised iron, asbestos cement sheeting, malthoid on timber base, and etc.

EAVES - are the lower edges of the roof surface which project beyond the face of the wall. Types of eaves vary according to the style of the architecture but the most popular types are the Boxed and Open Eave.

BOXED EAVE - A soffit joist is fitted between the rafter end and wall stud, providing a horizontal surface for fixing the soffit lining. If the soffit is lined with battens, allowing ventilation to the roof, the wall ventilators may be placed above the level of the soffit joist. If fibro-cement sheet, close boarding, or similar, is used, the ventilators may be placed below the eaves, or alternatively placed above the soffit joist with extra ventilators provided through the soffit lining.



CONSTRUCTION OF EAVES

OPEN EAVES - soffit joists are not provided and the lining which may be on top or underneath the rafters, follows the angle of the rafters. Some form of bird-proofing is used between the rafters.

WIRING ALONG THE EAVES.

To gain access to the eaves of a tiled dwelling, the last row of tiles may be lifted to lay the cable in the eaves. Room entry for the cable is then available through a wall ventilator. Alternatively, if battens are used, the cable may be stapled along the battens and then passed through the battens and into a room through a ventilator.

Avoid moving tiles near hipped or gabled ends as displacement of the tile capping can easily occur.

Care should be taken to ensure that the tiles are replaced correctly, and bird-proofing and spouting are not in any way disturbed.

FASCIA BOARD.
Generally the fascia board is fixed horizontally on edge, to the ends of the rafters and serves as the mounting for spouting.

BARGE BOARD.
The barge board is used to finish the edge of an over hanging gable roof.

FLAT ROOFS.
Many modern structures employ the flat roof in their construction. As there is only a small space between roof and ceiling, which is often filled with insulation, avoid working on this type of roof and seek an alternative means of cabling.

DOORS AND WINDOW CONSTRUCTION.

DOORS - The types and construction of doors do not concern the Technician, as any building access or room to room cabling, necessary near a doorway, will be via the architrave and door frame.
DOOR FRAME - This is the timber frame on which the door is hung. It consists of two side posts or "JAMBS" which are tenoned into the "HEAD" or horizontal top member. The frame is made from various thicknesses of wood according to the type and width of door.
DOOR STOPS - Are the three pieces of timber which are nailed to the door frame and against which the door closes.

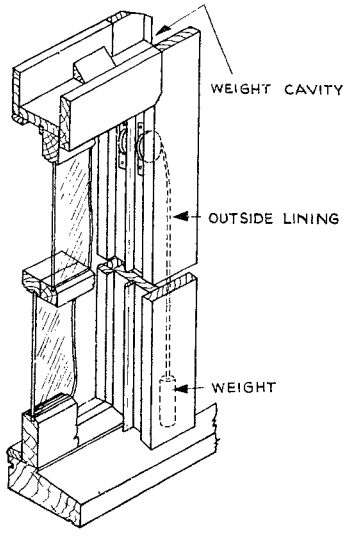
DOOR FRAMES IN TIMBER FRAMED DWELLINGS.

Trimming is arranged for EXTERNAL AND INTERNAL DOOR FRAMES by the fixing of door studs in the appropriate position in the wall framing. The door frame is then set in between the trimming studs and is packed and nailed.

DOOR FRAMES IN BRICK DWELLINGS.

External door frames are usually built in with the brickwork, but internal door frames are nailed in position to wooden plugs which have been driven into the brickwork seams in the face of the door opening.

TRANSOM - Sometimes a small window or fanlight is fitted above the door to allow for extra lighting or ventilation. To separate the door from the fanlight a horizontal member is introduced called a transom.



BOX WINDOW FRAME WITH DOUBLE HUNG SASHES

WINDOWS - consist of frames and sashes. Frames most commonly used are -

(a) BOX FRAMES, are made to receive the counter balancing weights of the sashes, and are built up by fastening the hollow box-like jambs to a solid sill.

(b) SOLID FRAMES, are used for casement, louvre and sliding sashes where counter weights are not required. For this reason the frames are solid, like external door frames.

(c) STEEL FRAMED WINDOWS, are in common use and are usually casement type. The surrounds of the steel frames are fitted with G.I. weather flashing which must not be disturbed.

SASHES - The sash is the part of the window made to receive the glass. Sashes are morticed on the inside edge and rebated on the outside to take the glass and putty.

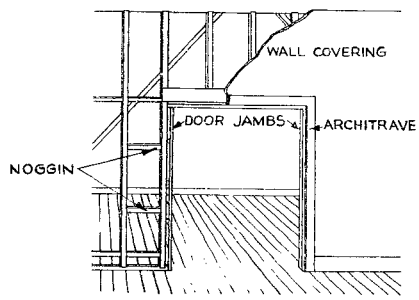
NOTE - When building access wiring is necessary near a window.

(a) Do not run the cable through the window opening.

(b) Insure that the cables do not pass through the weight cavity of box window frames.

(c) In all circumstances, arrange the entry points to avoid the access of moisture.

ARCHITRAVES - are used for finishing door and window openings. They cover the irregular spaces between door or window frames and the wall coverings. Designs and dimensions differ to suit various kinds of work. Electric light conduit and switches are often put behind or on architraves around door frames.



INSIDE TIMBER WALL CONSTRUCTION

WIRING ROOM TO ROOM.

IN TIMBER FRAMED DWELLINGS, it is comparatively easy to wire room to room, the cable running along skirting or picture rail, and passing through the wall fabric, clear of the studs, via a neat hole in an appropriate position.

IN BRICK DWELLINGS it is possible to provide room to room wiring through a single brick wall by means of a neat hole in a seam between the bricks. Use a fine pricker to penetrate the plaster, and the difference between the hard surface of the brick, and the mortar, in the joints is easily felt. Extreme skill and care must be used in the operation, as the plaster and rendering can easily be defaced, involving extensive patching. In older type brick dwellings it is not advisable to prick out a seam, as the lime mortar rendering under the plastered surface will crumble, extensively defacing the wall surface. The most satisfactory way is to pass from room to room via a neat hole bored through the architrave and door jamb or head. Carefully estimate the position of the hole to avoid defacing the architrave.

TYPES OF FLOORS.

The Technician will, in practice, encounter many different types of floors, and the problems associated with wiring along or under the floors, are individual to each job and must be treated accordingly.

Generally wooden floors in normal dwellings do not present any great difficulty but the following types of flooring are best left undisturbed, and alternative methods of cabling should be sought -

(a) TERRAZZO PAVING is composed of cement mixed with fragments of marble or coloured stone.
(b) MOSIAC TILING is a type of inlaid work, with patterns made with marble, tiles, etc.
(c) PARQUETRY is a type of inlaid woodwork in geometric or other patterns, laid on a base of concrete or wood.

CONCRETE FLOORS present a problem in wiring to isolated locations and often must be channelled for cabling. After laying in the cable, the channel is filled in with a bituminous compound. If the cable is run in conduit a cement mixture may be used. An alternative where the cable run is not excessive, and is not in a passage way is to provide a metal or wooden cover strip over the cable.

WIRING TO ISOLATED POSITIONS. Where tables are a fixture, the cable may be fastened to the table and the equipment mounted on the table. Where the table is not fixed, the cable must terminate on a floor block and a flexible connection to the equipment must be used.

WIRING THROUGH A CARPET. Cable may be laid under a carpet and under felt to an isolated position. If it should be necessary to pass wiring through a carpet, a hole can easily be made by using a pointed instrument, such as a pencil to poke a hole between the weave. A hole should not be cut if it can be avoided. In all cases the consent of the subscriber must be obtained before making the hole.

WIRING BENEATH A FLOOR COVERING. The essential part where any work is concerned involving floor coverings, is to raise only just as much as is necessary to perform the work required. Be careful to do the least amount of damage and then restore everything as near the original condition as possible.

MULTI-STORIED FLOOR CONSTRUCTION. Many different types will be encountered, but these can be subdivided into two broad classifications -

(a) Brick construction with wooden floors, as used in residences and older type city buildings.
(b) Reinforced concrete construction as used in modern buildings.

WOODEN FLOORS IN MULTI-STORIED CONSTRUCTIONS. The general ground floor construction of these buildings is as previously described, but the subdivision between subsequent stories of the building, is formed by large joists, which in the larger buildings are fastened on girders or beams. The joists are tied together by herringbone strutting. The ceiling of the lower floor is battened to the under side of the joists, and the flooring of the next storey is nailed to the top of the joists. Wiring in such floors can only be achieved by using floor traps, and avoiding the herringbone strutting.

REINFORCED CONCRETE CONSTRUCTIONS. This is used in many forms in buildings of all types. The concrete is reinforced with bars or rods of steel. Entire buildings are erected using reinforced concrete, and although in the past it was mainly confined to large buildings, many modern homes have reinforced concrete walls.

WALL CHASES. It is becoming the practice to make provision for the wiring of telephone services during construction of large buildings. For runs along walls, special picture moulding is sometimes used, or a cavity is left behind a removable skirting, or moulding higher up the wall.

RISER SHAFTS. For wiring or cabling from floor to floor, riser shafts are often provided. They are made by leaving vertical cavities in walls or supporting pillars, sometimes by building a false front on a wall or pillar. Access is obtained by removable fronts, or in large shafts, by a door on each floor. The provision of a wooden running board is made to facilitate the securing of cables.

FLOOR CONDUITS AND DUCTS. Under-floor distribution is often required for telephones at points not adjacent to walls or where continuous runs on walls can not be made. Provision is often made by architects, in conjunction with P.M.G. staff, for inclusion of suitable types of under-floor runs of seamless steel conduit, fibre or steel ducts, during the construction of the building. For drawing-in cables, draw wires are used and Draw Boxes are located at suitable points in the system and at terminal boxes. Various types of outlets are used, according to requirements regarding the position of services, and types of system used.