

Another example of a parallel gutter is shown in Fig. 72 and a further example is shown at G, Fig. 24.

(b) *Tapered Parapet Gutter* (see J, K and N, Fig. 71).—The wood details of this gutter are described on p. 81 (see also N). This gutter, tapered on plan, is divided into sections by a roll and drips as described above. As shown on the plan K, the lower edge of the slating has to be cut parallel to the tapered side of the gutter. The section at N shows the width increases due to the fall of each "bay" of the gutter and the drip. The shape of the gutter on plan is developed by transferring to it from the section the various widths at the lower and upper ends of each bay. The section also shows the lead turned up 6-in. against the wall and about 9-in. up the slope. The tilting fillet is fixed with its lower edge 3-in. above and parallel to the intersection between the gutter and roof boarding. The details of the cesspool, drips, roll, flashings, etc., are similar to those already described. Another example of a tapered gutter is shown by broken lines in the elevation in Fig. 21 and the section at F, Fig. 24, the section being taken through the gutter immediately above the cesspool.

(c) *V-gutters*.—This type is formed along the lower intersection between two sloping roof surfaces. The groundwork may consist of bearers fixed to the sides of the spars (at various heights to suit the fall of the gutter) as shown at T, Fig. 36, when the construction resembles that of a tapered gutter, or the lower ends of the spars of each slope may be birdsmouthed over a pole plate as shown at A, Fig. 71, to form a parallel gutter. Long lengths of such gutters must be divided by rolls and drips as above described.

Cast iron eaves gutters are described on pp. 153-154.

FLATS (see Fig. 72).—The wood construction has been described on p. 70. It has been mentioned that the minimum fall is $1\frac{1}{2}$ -in. in 10-ft. To prevent water standing when the flat has been given such a small fall, it is necessary that precautions against warping should be taken and therefore narrow, well-seasoned boards only should be used and these should be laid with their length in the direction of the fall. The surface of the boarding should be "flogged" (*i.e.*, dressed over with a plane or machine) to remove sharp edges and irregularities which may damage the lead. Occasionally the boarding is covered with roofing felt, laid with butt joints, and this assists in ensuring a uniform surface for the lead.

The key plan at S and the sketch at A show the roof of a small building (an adjunct to a larger building) which is divided into six bays and a parallel gutter. The rolls have been shown purposely at maximum centres of 2-ft. 6-in.; this gives an economical roof if 7-ft. wide rolls are used which are cut up the centre to give 3-ft. 6-in. widths, as the minimum waste of lead thereby results.

The construction of the rolls, drips, gutter and flashings has been already described. The detail at R shows the drip, with the oversheet turned on to the flat and over the bossed end of the roll. Note: (1) the furring piece which is nailed on to the top of the joist to give the necessary fall to the boarding, (2) the overcloak or oversheet of the drip is lapped 3-in. over the roll below and (3) the

end of the roll is slightly bevelled to facilitate the bossing of the lead. In forming the bossed end, the undercloak is dressed round to partially cover the end, and the overcloak is bossed to completely cover it and the roll below. In order to minimize the risk of the overcloaks of rolls being lifted by the wind, they should be dressed with their free edges least exposed to the prevailing wind. Note that at A and Q the overcloak of the drip at the gutter is not continued on to the bed, but is dressed just clear of it at the upper end. The overcloak at the bossed end of each roll at the gutter is continued down the drip and secured by a small clip or piece of lead (which has been left on the undercloak when trimming it) which is turned over it (see Q).

Forming Lead Flats.—The following is the order in which leadwork for the flat at A would be executed: Cesspool with outlet pipe (although the fixing of the latter may be deferred), gutter, lower side bay with undercloak, lower middle bay, lower side bay with overcloak, upper side bay with undercloak, upper middle bay, and upper side bay with overcloak. The cover flashing is then fixed in the mortar joints which have been previously raked out for at least 1 in., preferably before the mortar has set; the first length of flashing to be fixed is that over the upturn of the gutter, commencing at the cesspool end, and after completing those at the sides, that along the top end is fixed; the flashings are wedged and the mortar joints are pointed with cement mortar or oil mastic.

The following tools (illustrated in Fig. 76) are used in carrying out the various labours when covering this roof: The dresser (A) is employed for dressing the lead on the boarding; the overcloaks and undercloaks are formed with the bossing stick (B) and setting-in stick (J), the sharp edge on the latter being useful for working the lead well into the angles of the rolls and for forming the upturns of the sheets against the walls, etc.; the bossing mallet (D) is employed for working the lead into corners. The chase wedge (K) serves the same purpose as the setting-in stick for working the angles of rolls, drips, etc., in gutters and where the space is restricted, the wedge being driven by the mallet. The drip plate (L) is introduced when lead is dressed over lead, as at the angles of overcloaks; the plate is slipped between the lower sheet (which has been worked) and the overcloak, and the latter can then be bossed into the angle without disturbing the bottom sheet.

Forming a Cesspool.—A brief description of the formation of a cesspool is as follows: A piece of lead is cut sufficiently large to form the base and sides and it is set out by chalk-marking the lines along which will be formed the angles at the base and sides. (NOTE.—Lead must never be marked or scored with a knife or similar sharp object as this at once weakens it; chalk-line marking should only be adopted.) Shallow grooves are formed along the base lines by placing the setting-in stick on them and sharply striking it with the bossing mallet. The lead is turned with the bottom upwards and gently tapped parallel to and about 1-in. inside the base lines; this assists in stiffening the base and keeping it firm. The lead is turned over and the sides are bent upwards on the grooves, the corners being left. Each corner is then separately bossed up by using the mallet and bossing stick, the former being held inside the "box" (cesspool) as the bossing stick is applied to work the surplus lead gradually from the bottom upwards. Care must be taken not to drag the lead from the corner or cause the base to lift; if a crease appears, it must be at once knocked out or the lead will pucker and split. As it is gradually bossed upwards, some of the superfluous lead at the top should be cut off to enable the remainder to boss up more easily. This process is repeated at all corners and the sides are cut off to the required height. The cesspool is holed, dressed in position as required and the outlet pipe connected to it as already described.

Bending Lead Pipes.—The following describes the bending of a lead pipe such as that shown at Q, Fig. 72: The pipe is slightly heated at the position where the bend is to be formed; it is then bent over the knee and this flattens the pipe at the throat; the long dummy (Y) is now used to approximately restore the pipe to a circular section by inserting the "straight end" (head C') and working it up and down until the