

the edge of the lead is bent and turned back to completely line the raglet, and the wedges are driven into the folded edge.

Oak wedges are sometimes used in cheap work. These are apt to become loose when they shrink.

Tacks, Tingles or Clips are strips of lead used to stiffen flashings and prevent their free edges being lifted by a strong wind. They are from 2 to 3-in. wide and are placed at a distance apart not exceeding 2-ft. 6-in. As shown at M, Fig. 72, each tack is fixed in the joint, and it is sufficiently long to turn over and grip the free edge of the flashing by about 1-in. Tacks are also required to secure hollow rolls at 2-ft. intervals (L, Fig. 72), and welts and ridge coverings at 2 to 4-ft. intervals (see B, R and S, Fig. 73), the fixed ends of the tacks being clout-nailed to the boarding (or ridge) as shown. Copper tacks, being stiffer than lead, are used for first-class work (see below.)

JOINTS.—As already mentioned, provision must be made to allow lead to expand and contract, and the joints between sheets must be formed so as to permit of this movement. The various joints are: (1) laps, (2) rolls, (3) drips and (4) welts.

(1) *Lap Joints.*—These occur at a maximum of 7 to 9-ft. apart (depending upon the width of the roll) for flashings, upturns of gutters, ridges, hips, valleys and lead coverings of pitched roofs. They are also called *passings*. The amount of lap (distance that one piece covers the adjacent piece of lead) is usually 4-in. for cover flashings, upturns of gutters and aprons, and 6-in. for stepped and raking flashings, ridges, hips and valleys.

The side laps of lead covering pitched roofs are in the form of rolls or welts (see below) and the lower edge of each upper sheet laps the top edge of the sheet below it to form a horizontal joint. The amount of lap at such horizontal joints depends upon the pitch; it is usually 6-in. when the pitch exceeds 45°, and this may be increased to 9-in. for flatter pitches. Alternatively, horizontal welts may be used instead of wide laps, but these may detract from the appearance of the roof.

When the slope of a roof is less than 15°, the horizontal joints between the sheets of lead are usually in the form of drips (see below).

(2) *Rolls.*—This form of joint is required on lead-covered flats, pitched roofs, ridges, certain forms of hips and long gutters. They are placed at intervals varying from 1-ft. 6-in. to a maximum of 2-ft. 6-in. for flats and similar construction.

There are three kinds of rolls, *i.e.*, two forms of covering wood or solid rolls and a hollow roll.

Solid Rolls.—One form is shown at P, Fig. 71, and J, Fig. 72.¹ The wood roll is shaped as shown and is nailed or screwed to the boarding. One edge of a sheet is dressed into the angle between the roll and boarding and continued beyond the crown as shown. This is called the *undercloak* or *undersheet*. Its edge is secured with 1-in. copper nails at 1 to 6-in. apart (depending upon the

¹ The space between the lead in these and similar details is exaggerated.

quality of the work) and the edge is rasped off. The edge of the adjacent sheet is worked into the angle, passed over the undercloak and continued 1 to 2-in. on to the flat of the roof or bed of the gutter. This is known as the *overcloak* or *oversheet*.

The second form of solid roll is shown at K, Fig. 72. The undercloak is dressed and secured as above described, but the overcloak is brought over to within ¼ to 1-in. of the flat on the other side. This method was generally preferred in the North of England, but now both forms of solid rolls are adopted equally there.

There is a difference of opinion as to which of the two methods shown at J and K is the best. In the former, water may gain access between the sheets by capillary attraction. Whilst this is avoided at K, this practice is not recommended for exposed positions as the free edge of the overcloak, having an inadequate grip, may be lifted by strong winds.

The treatment at the ends of solid rolls is referred to on p. 146.

Hollow Roll.—This type is adopted for best work in connection with lead-covered pitched roofs, and especially if cast lead is to be used¹; it is also suitable for curved surfaces, such as domes, where wood rolls could not be employed economically. The roll is supported by "stout" (preferably from "8-lb. lead") lead tacks or tingles which are 2-in. wide and 6 to 7-in. long; these are placed at 2-ft. apart, and one end of each is secured to the boarding by two copper clout nails, the boarding having been slightly recessed to receive it. Copper tacks, being stronger than lead, are used in superior work, each end being secured by two brass screws. When turning a hollow roll, the edge of the undercloak is upturned vertically, the tacks are fixed and their free ends are turned over the undercloak, the edge of the overcloak is upturned and also turned over the undercloak, and the whole is finally dressed to the form shown in the illustration. Hollow rolls are not suitable for flat roofs as they are liable to be damaged if trodden on.

Rolls are again referred to in the following pages.

(3) *Drips* or *Steps* are formed on flats and in gutters which exceed 8-ft. in width or length, and they are placed across the fall. They are generally 2-in. and sometimes 3-in. deep.

Three forms of drips are shown at Q, Fig. 71, and R, T, and U, Fig. 72. The 2-in. drips at Q and R show the upper edge of the lower sheet (called the *undersheet*) dressed into the angle, continued up the step or drip, and dressed into the 1½-in. wide shallow rebate formed along the edge of the boarding to which it is close copper-nailed. The object of the rebate is to avoid a ridge in the lead. The lower edge of the upper sheet (called the *oversheet*) is dressed over it, and like the roll at J, is continued on the flat or bed for 1 to 2-in. The 3-in. drip at T has the oversheet stopped short of the flat; water cannot thereby gain access

¹ Hollow rolls, 2½-in. diameter, are employed on the roof of the Library referred to in the footnote on p. 142, and these are secured by 6-in. by 3-in. copper tacks at 2-ft. intervals.