

is placed on the brick window sill which it serves to protect. These props are struted apart as shown.

Reference is made on p. 24 to the method which is adopted to ensure that the arch joints radiate to a common point. A nail is driven into the strut at this point and a cord (or "line") is fastened to it. The line is shown in the illustration as coinciding with one of the voussoir joints.

A turning piece suitable for an arch with a $2\frac{1}{2}$ -in. camber is shown at D, Fig. 43.

Turning pieces for relieving arches rest upon folding wedges supported directly by the wood lintels and they are therefore cambered so as to finish with true edges at the ends in order that all but the two end voussoirs may be constructed on the turning piece.

Centres.—Arches which have wider soffits than $4\frac{1}{2}$ -in. are "turned" upon centres which are constructed of *ribs* and *laggings*. Such a centre with a similar camber to that at D is shown at E, Fig. 43. The laggings or narrow battens are nailed across two $4\frac{1}{2}$ -in. by 1-in. ribs which have a $2\frac{1}{2}$ -in. camber. The centre is completed by nailing a 3-in. by 1-in. cross-member, called a *bearer* or *bearing piece*, to the underside of the ribs at each end. The sizes of the members vary according to the timber available, thus the thickness of the ribs is sometimes 11-in. and the laggings vary from 3-in. by $\frac{5}{8}$ -in. to 2-in. by 1-in. Both open and close lagging are shown at E. The former is suitable for axed and rough arches, and close lagging is adopted for gauged arches. The distance apart of the laggings when open varies from $\frac{3}{4}$ to 1-in., except when the centres are required for masonry arches, when the spacing is increased (see M, Fig. 43).

A suitable centre for a segmental arch is shown at F and G, Fig. 43. This arch is similar to that shown at D, Fig. 15. Both close and open laggings are shown.

A suitably designed centre for a semicircular arch (such as that at K, Fig. 15) is shown at J and K, Fig. 43. As it is not economical to use timber which exceeds 11-in. in width, it is necessary to construct the ribs as shown with upper and

lower *ties* nailed to them. Narrow laggings should be used in order that they will conform to the curve of the arch. The 3-in. by 1-in. *brace* to which the upper ends of the ribs are notched serves as a support for the tiled key (which projects below the soffit) and also assists in stiffening the centre. Each support consists of two posts or props to which is nailed or dogged a 3-in. by 2-in. bearer at the top and a similar sleeper plate at the bottom.

A centre suitable for a semicircular arch having a span of 6-ft. is shown at M, N and O, Fig. 43. Each of the two ribs is made of two thicknesses of 9-in. by 1-in. pieces, spiked together, which overlap and have joints normal to the curve. Such are called *built-up* ribs. Each rib has double 7-in. by 1-in. or $1\frac{1}{4}$ -in. ties and three 4-in. by 1-in. struts, indicated by S and R, the latter being necessary to prevent the centre being deformed by the weight of the arch. The cross bracing provided by the 4-in. by 1-in. inclined brace Q and the horizontal brace T increases the rigidity. The laggings, which must be at least 1-in. thick, may be either open or close, depending upon the type of arch to be supported.

For masonry arches the laggings may be spaced to allow two per voussoir, as shown at the right half of the elevation M, or alternatively small *setting wedges* as shown on the left of the elevation may be preferred. The arch in the example is that of the main entrance shown in Fig. 24, and for each of the large voussoirs four sets of wedges would be used, two on each built-up rib. The wedges over the props are inserted between two stout bearers, and to facilitate the easing of the centre these wedges are sometimes greased. The props may be braced by an inclined member as shown by broken lines in the section PP. A trammel rod (referred to on p. 24) is cut to the net length of the radius of the arch. A block is nailed to the underside and at the centre of the ties, and the lower end of the rod is screwed sufficiently tightly at the centre of the semicircle to permit the rod to traverse the soffit of each voussoir as it is being wedged and bedded. This assures an accurately curved soffit. The sketch at O may assist in making the construction clear. A centre of similar construction may be used for segmental arches of this span.