

blocks of facings are alternately $\frac{1}{2}$ and 1-brick thick. The facings may be built in either English, Flemish or any of the bonds A, B, C or D, Fig. 18 (with snap headers at the $\frac{1}{2}$ -brick thick blocks), and the backing is built in English bond. Somewhat similar construction may be applied to $1\frac{1}{2}$ -brick walls, with the backing to the alternating 9-in. thick facing blocks built in stretching bond.

A modified form of facing bond may be applied to 9-in. thick walls. Thus, the facings and commons would be built in $\frac{1}{2}$ -brick thick leaves in stretching bond with facing heading courses at suitable intervals. If the facing and backing bed joints coincide, as shown at G, such facing headers would appear at every fifth facing course.

Facing bond is not, of course, as strong as English bond, but the alternative would be to use thin bricks for the backing of the same thickness as the facings. And this would add considerably to the cost, especially if the facings were 2-in. or less.

ARCHES

A description of several forms of arches is given on pp. 22-26, Vol. I.

SEMICIRCULAR ARCH WITH ORDERS.—An opening in a thick wall is often finished with either splayed or stepped jambs (see p. 39) and an arch comprising several rings of diminishing width or thickness. The arch is thus recessed or stepped by a series of rings known as *orders* (or "rows"). It is applied to both door and window openings and has a satisfactory appearance.

An example of this type of arch is shown at A, B and C, Fig. 19, which illustrates a main entrance to a house. Special attention is drawn to the section at C, which shows the bonding of the arch as each ring extends to the inner face. This is known as a *bonded* arch. It is much stronger than the alternative unbonded arch, often applied, when $4\frac{1}{2}$ -in. by $4\frac{1}{2}$ -in. by 3-in. voussoirs are used for each ring which is therefore only $4\frac{1}{2}$ -in. wide on soffit. The impost is shown consisting of a double row of tiles which project $\frac{3}{4}$ -in. An alternative is a thin stone course or a course of purpose-made bricks.

It is assumed that the door shown opens into an outer lobby, otherwise the thickness of the wall should be increased, with the inner ring at least 9-in. wide on soffit.

The two steps, of combined height equal to the brick-on-end plinth, are formed with bricks-on-edge in cement. These bricks must be hard and durable, otherwise the arrises would be readily damaged. The bottom step is segmental with a 4-ft. radius, and consists of purpose-made bricks with a tile-on-edge infilling; the vertical joints are radial.

Another example of a semicircular arch with orders is shown at P.14, Fig. 24. This arch is three-ringed and the stepped recesses are continued down the jambs to the steps of the doorway. This is an alternative treatment to the splayed jambs shown at A, Fig. 19 (see also p. 64).

A semicircular arch with a toothed or *indented* extrados is shown at P.13, Fig. 24 (see also p. 64).

STILTED SEMICIRCULAR ARCH WITH SEGMENTAL RERE ARCH (see u, v, w, x and z, Fig. 19).—A stilted (or elevated) arch is one which has its springing line above the impost. Thus, the amount of stiling of the semicircular arch at u is equal to two courses. In the absence of an impost the arch is continued below the springing line with several parallel voussoirs, any difference in texture and colour between the voussoirs and general walling producing the stilted effect. This arch is enriched by a slightly projecting crown course known as a *label* (see u and the section at z). When the label consists of moulded bricks (or stone) it is called a *hood mould*. The voussoirs and label are of purpose-made bricks, and the arch is bonded on face.

When the jambs of an opening are rebated, the external arch need not necessarily be of the same shape as the internal arch. Thus the external arch at u is semicircular of 2-ft. 3-in. radius, and the inner arch is segmental of 6-ft. radius. As the internal jambs are splayed, as shown at w and x, the intersection between the soffit of the segmental arch and a splayed jamb will take the form of a curve as indicated at z. This segmental arch is known as a *rere* (meaning "back" or "rear") arch.

The development of the curved intersection is shown at x, v and z. The plan at x and sectional elevation z of the splayed jamb are each divided into four or any convenient number of equal parts. Vertical lines are projected from the quarter-points 1, 2 and 3 on the plan to the intrados of the segmental arch. Horizontal lines are drawn from the points 5, 1, 2, 3 and 4 on the intrados to intersect the corresponding vertical lines at z. A line 5, 1, 2, 3 and 4 drawn through these points of intersection gives the required curve, as shown at z. Horizontal lines projected from the voussoir joints at the intrados of the segmental arch at v to z give the level soffit joints in section yy.

CIRCULAR OR BULL'S-EYE ARCH (see H, Fig. 19).—This form of arch is chiefly adopted as an external decorative feature to receive either a fixed light or frame with a pivoted sash. Circular openings in internal walls are occasionally required through which metal smoke flues, ventilating tubes, etc., are passed. Purpose-made, rubber or axed bricks are used externally, and an internal arch is usually a rough ring.

Construction.—The lower half or *invert* of this arch is first built. The adjacent brickwork which will form the base for this lower half is built from course z and racked back up to course y at the centre. A wood batten is laid across the opening and weighed at the ends on course y, and the trammel rod or *radius rod* (see p. 85, Vol. I) is screwed or nailed to it at the centre; allowance for the thickness of the bed joint at the extrados must be made in determining the length of the rod. Course z is completed; stretchers 1, 2 and 3 are laid temporarily in position and marked to the required curve as the radius rod is traversed; these bricks are cut with a hammer and bolster (see 35, Fig. 19, Vol. I) and trimmed accurately to shape with a scutch; they are then laid permanently. Each course up to the middle line is completed in this manner, after which the purpose-made voussoirs forming the lower half of the arch are bedded in position, the radius rod being used to check the radial joints and curve. Finally, the upper half of the arch is constructed by the usual method, a wood centre on struts being used as a temporary support (see p. 60, Vol. III).

SEMI-ELLIPTICAL ARCH (see J, Fig. 19).—This shows half of an axed arch, bonded on face with a portion of a tiled key, and a half arch in three rough rings. Both purpose-mades and rubbers may be used for the former.