CORNICE MITERS.

A few years since a cornice workman's ability to develop what were called pinnacle miters, was conclusive evidence of his fitness for the position of pattern cutter or foreman in an average cornice shop. The writer's first introduction to the art and mysteries of mitre cutting was in a shop in which at the time a very considerable number of Gothic pinnacles were being constructed. The patterns used in the shop were all gotten out by the proprietor—a German—a man of exceptional mechanical ability and insight in many particulars, but quite as arbitrary in others as any of his nationality. All the patterns had been cut for these pinnacles, except the mitres at the eaves of the gables between adjacent sides. It was after working hours, and all the men had gone home. My German friend was busily engaged upon the parts in question, fastening short sections of the moulding upon two gables, and, by scribing their ends where they touched, gradually marking out a pattern for the part by the old rule variously described. Some call it the "ship carpenter's" rule, others the "cut-and-try" rule, and still others the rule of "main strength and ignorance." The writer at once volunteered assistance in holding the parts, and a conversation upon pattern cutting ensued. My friend's ability upon ordinary patterns was well known, and this was the first time I had ever seen anything in his work which looked as though he was beyond his depth. He was much better qualified for his work than most mechanics who, at that time, had undertaken the manufacture of sheet-metal cornices. As a boy in Prussia, his native country, he had attended a technical school—had, in fact, learned his trade under competent instructions in a school organized for such purposes. He had pursued the study of practical geometry under the immediate care of no less a person than Prof. Kaetz, the author of a German work on pattern cutting with which many of our readers are familiar. In every matter to which my attention had before been called my friend had done credit to his teachers and the school from which he was a graduate. Knowing these facts, I was somewhat astonished at seeing his method in this particular case, and asked him why he did not use his drawing-board and tools instead of cutting and fitting. Not to be cornered, and unwilling to own his real perplexity, he entered upon a long explanation of how it was that certain miters could not be cut by geometrical rule, and to be satisfactory in all respects must be cut by fitting upon the actual work as he was then doing. It is needless to say that the argument did not appear conclusive, although at that time the writer knew absolutely nothing about pattern cutting. The conversation in question was one of the first things to call his attention to the need of systematic instruction in that important art. The incident passed with very little thought at the time. My friend's statements were not disputed, but as they came up in memory at intervals afterward, the mental comment was—"very strange, if true." All this was long before the days of *The Metal Worker*. Otherwise, some effort would undoubtedly have been made towards learning if other mechanics held the same views. The pinnacles were duly finished, shipped to their destination and put in place. I have seen them several times during the years that have passed since their construction, and have often reverted in mind to the conversation that occurred that evening in the shop when they were being made. Once afterward I saw my friend in perplexity over a sheet-metal pattern. It was an O G transition piece between a square base and octagon shaft. It was after this second incident that the course of investigation was determined upon, the results of which have appeared in *The Metal Worker* during the past four or five years, and the complete record of which will be shown in the new pattern book now nearly ready to send out. The present article will be devoted to an explanation of the geometrical principles of cutting pinnacle miters which so puzzled my German friend upon the occasion referred to. Its preparation has brought fresh to my mind the incident described. My friend went to his long home some years since, and, therefore, this account has not been penned for his perusal. He learned to cut pinnacle miters before his death, and often laughed at the conversation of the evening when he attempted to explain why certain miters could not be cut by rule.

Fig. 18 shows the elevation of one of four similar gables occurring in a square pinnacle. The profile of the moulding is shown by P. The first step is to obtain the miter line shown at K, from which to measure for the pattern. Draw the profile P in the molding, as shown, placing it so that its members will correspond with the lines of the molding. Draw a second profile, P¹, in the side view of the gable, placing it, as shown in the engraving, so that its members will coincide with the line of the side view, and also with the first profile already drawn. Space both of these profiles into the same number of parts in the usual manner, and through the points thus obtained draw lines parallel to the lines of the elevation, as shown. Trace a line through these intersections. Then K is the line in elevation upon which the mouldings will mitre. Draw the mitre line O M for the top of the gable, as shown. Upon any line, as G H, drawn at right angles to the line of the gable in elevation, lay off a stretchout of the profile, as shown by the small figures. Through these points draw measuring lines, as shown. Place the T-square parallel to the stretchout line, or, what is the same, at right angles to the line of the gable, and, bringing it successively against the several points in O M and the miter line K, cut the corresponding measuring lines, as shown. Make $E^1 D^1$ equal to E D of the side view of the gable, and set it off at right angles to $E^1 B^1$. In like manner, at right angles to the same line, set off $A^1 B^1$ equal to A B of the view side. Draw the line indicated by $A^1 D^1$, as shown, and trace lines through the intersection of point dropped from the elevation on to the measuring lines, thus completing the patterns.

Another way of making a joint in this position is shown in Fig. 19. Let A C be one of the gables in profile and B D the other in elevation, the moldings forming a joint against a ball, the center of which is shown at E. For the patterns proceed as follows: Place the profile in each gable as shown by F and F^1, locating them in such a manner with regard to their respective positions that corresponding points in each shall fall upon the same lines. Divide each of these profiles into the same number of equal parts, as indicated by the small figures. From the points thus obtained in F drop lines vertically, meeting the profile of the ball, as shown from C to F. From the center E of the ball erect a vertical line, as shown by E F. From the points in C F already obtained carry lines horizontally, cutting E F, as shown, and thence continue them, by arcs struck from E as center, until they meet corresponding points dropped from the profile F_1 by lines parallel to the gable in elevation. Through the intersections thus obtained trace a line, as indicated by G H. Then G H will be the miter line in elevation. At right angles to the gable lay of a stretchout of the profile at any convenient place, as shown by P R, through the points in which draw the usual measuring lines. Place the T-square parallel to the stretchout line, or, what is the same, at right angles to the lines of the gable, and, bringing it successively against the points in the miter line G H, cut the corresponding measuring lines. Since the surface against which the two mouldings miter is that of a sphere, the pattern representing the space between the points 1 and 2 of the profile, and also between 7 and 8 of the profile, will necessarily be an arc of a circle. Therefore in the pattern the line running from S to U, and also the line from V to T, must be struck from centers which are to be found. By inspection of the elevation, it will be seen that the space S U is equal to that of D G struck from the centre E. Set the dividers, therefore, to E D or E G of the elevation, and from S and U respectfully as centers, strike arcs, which will be found to intersect at N. Then N is the center by which to describe the arc S U. By further inspection it will be seen that the lines corresponding to 7 and 8 of the stretchout meet the profile of the ball at M. Continue this line indefinitely in the direction of K. From E, at right angles to it, draw the line E K. Then K M is a radius of the arc to be described from V to T. Set the dividers to K M, and from V and T respectively as centers, strike arcs which will intersect in the point O. From O, with the same radius, describe the arc V T. Trace a line through the points from U to V. Then S U V T is the pattern for the gable moulding to fit against the ball, as shown.

THE telephone has been successfully worked over a distance of 350 miles between Buffalo and Patterson in New York and New Jersey States. The voice could be recognized, but owing to the sputtering and snapping caused by induction (the wires were close to the ordinary lines), the words could not be distinguised. The experiments were made to test a method of adjusting the battery-power devised by Mr. Noonan, manager of the Paterson Telephone Company, and were deemed highlly successful.

"JERRY" building has thus been defined: Joshua, the son of Nun, walked round Jericho in the old time and caused trumpets to be blown, whereupon the walls fell with such facility that the builders thereof were greatly blamed, and their work became proverbial. No more odious epithet henceforward could be laid upon a builder than to be called a "Jericho builder," or, as the name has, in the progress of the ages, been corrupted, a "jerry builder.