

Fig. 52.

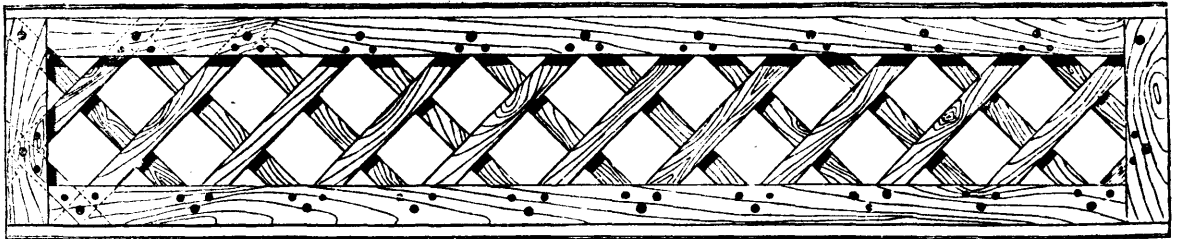


Fig. 50.

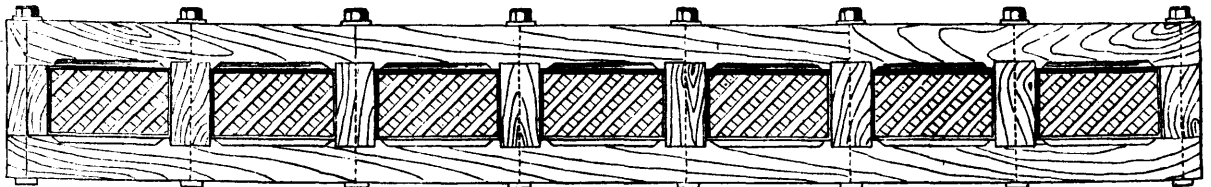


Fig. 49.



Fig. 53.

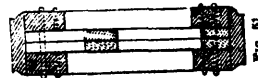


Fig. 51.

CONSTRUCTIVE CARPENTRY.

COMPOUND BEAMS.

As the resistance of a beam against a load from above increases in the simple ratio of the width, and in the ration of the square of the hight, there is a great advantage in increasing the vertical dimensions; to place the beams unconnected, one on the top of the other, only increases the strength in the simple ratio of the hight, two beams having double the strength of one, whether laid next to one another or above one another; but if in the latter case they are rigidly connected, the strength of two beams will equal four times that of the single beam. The strength can even be further increased when the beams are connected at a distance, as represented in Fig. 49, when, by filling up the spaces between the vertical connected studs and screw-bolts with proper designs, the beam may be given an ornamental appearance. Such beams are often seen in large halls, and are sometimes even used for small bridges.

In Fig. 50 the screw-bolts and studs of Fig. 49 are left out, but the upper and lower beam, placed at a distance of about twice the hight of each, are connected by oblique trusses, similar to those filling up the openings in Fig. 49, but on a larger scale, so as to secure a perfectly rigid connection and proper strength. In Fig. 51 this combination is seen on edge, or rather section, passing through the pins, which hold the oblique trusses in place.

We cannot however recommend the latter combination (which we have copied from a recent German architectural work), as the difference between extension and compression strain has not been properly regarded, while the pins as here used are very unreliable and weak. The reader will become convinced of this by referring to the two excellent articles on bridge building by an esteemed contributor, Mr. Dudley Blanchard, to be found in our Jan. and Feb. numbers for 1874.

Fig. 52 is a better combination in all respects; the braces are

not kept connected by mere transverse pins, but are kept rigidly in place by long screw-bolts, of which Fig. 53 represents a cross-section through one of these bolts. Fig. 12, on page 34, Vol. VI., gives a similar combination, the strength of which depends also on the vertical screw-bolts, passing through the whole depth of the combination; but in this the wood is replaced by cast-iron; however, the whole structure as represented in Fig. 12, can also be executed in wood with rod-iron screw-bolts, on the principle shown in the present Fig. 52 and 53.

THE BED-BUGS IN SWALLOWS' NESTS.—During a late trip to the western Territories, Prof. Leidy, while watching some cliff swallows passing in and out of their mud-built nests, was told that these nests swarmed with bed-bugs, and that people would not usually allow the birds to build in such places, because they introduced bed-bugs into the houses. He collected a number of the bugs from the swallows' nests as well as from the houses. The latter were found to be the true bed-bug; the former the *Cimex hirundinis*. The bugs infesting the bat and pigeon have likewise been recognised as a peculiar species with the name of *C. pipitrelli* and *C. columbarius*. The habit of *C. hirundinis* was found to be similar to that of *C. lectularius*, the bed-bug in the fact that the bugs during the day-time would secrete themselves in the crevices of the boards, away from the nests. After sunset he had observed the bugs leave their hiding places and make their way to the nests. From these observations it would appear as if the bugs peculiar to these animals (swallows and men) did not reciprocally infest their hosts.

THE famine now prevailing in the northern provinces of China, and which must continue at least six months longer, is being marked by fearful horrors. In one town a man opened a shop for the sale of human flesh, and did a good business in cannibalistic joints and roasts till the local Mandarin caused the shopkeeper to be arrested and beheaded.