No. 822,295. PATENTED JUNE 5, 1906.

A. MÜLLER.

FRAME BUILDING.

APPLICATION FILED NOV. 12, 1904.

4 SHEETS—SHEET 1.

Fig. 1.

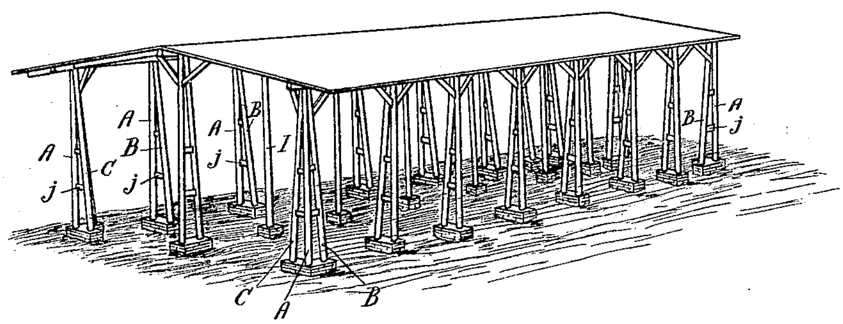


Fig. 2.

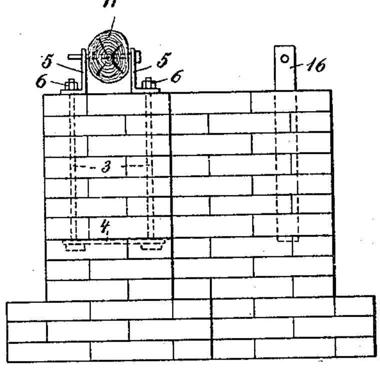


Fig. 4.

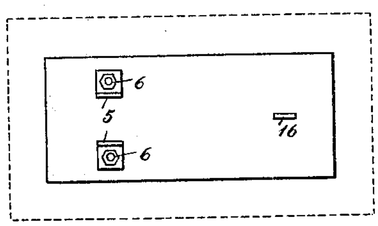


Fig. 3.

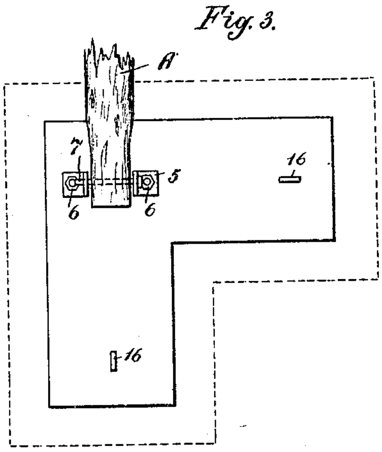
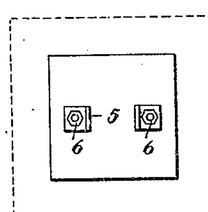


Fig. 5.



Witnesses

Inventor

Arthur Müller

by his Attorney

No. 822,295. PATENTED JUNE 5, 1906.

A. MÜLLER.

FRAME BUILDING.

APPLICATION FILED NOV. 12, 1904.

4 SHEETS—SHEET 2.

Fig. 6.

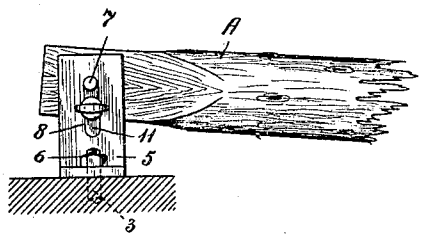


Fig. 7.

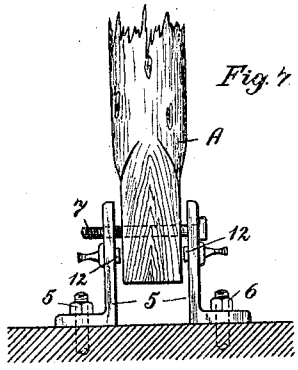


Fig. 8.

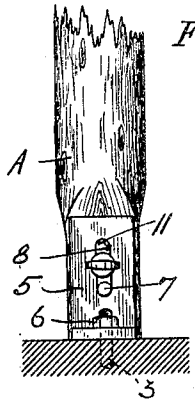


Fig. 9.

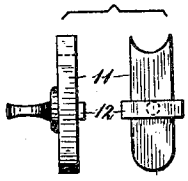


Fig. 10.

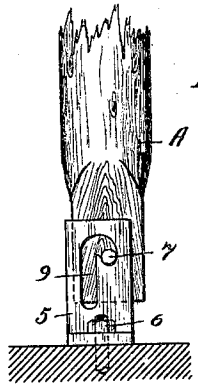


Fig. 11.

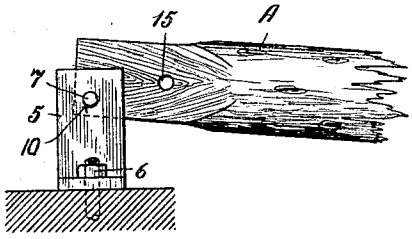


Fig. 12.

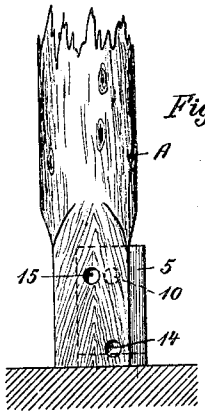
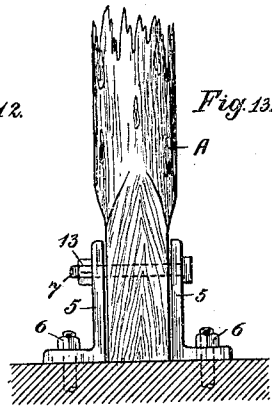


Fig. 13.



Witnesses:
A. J. Maddaus
A. C. Hathaway

Inventor:
Arthur Müller
by his Attorney A. Maddaus

No. 822,295. PATENTED JUNE 5, 1906.

A. MÜLLER.

FRAME BUILDING.

APPLICATION FILED NOV. 12, 1904.

4 SHEETS—SHEET 3.

Fig. 14.

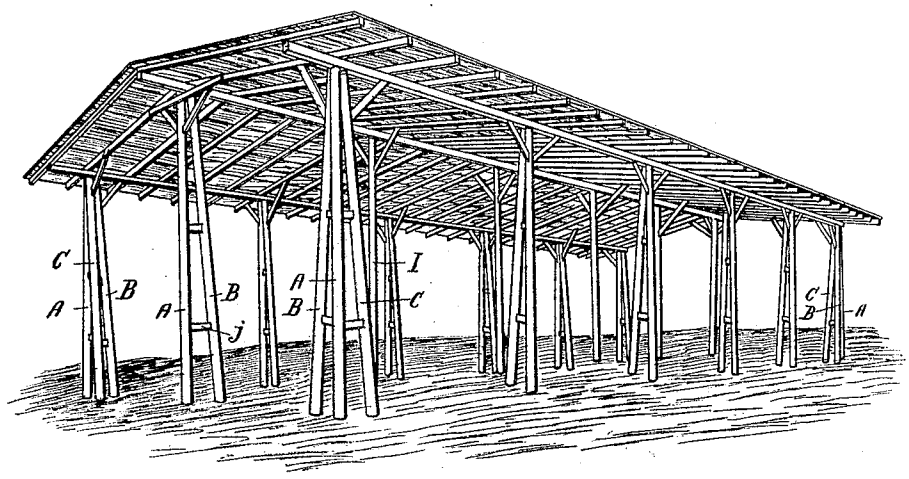


Fig. 15.

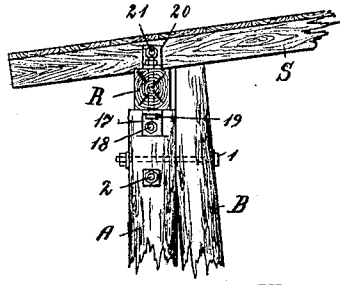


Fig. 16.

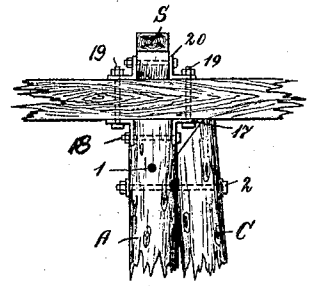


Fig. 17.

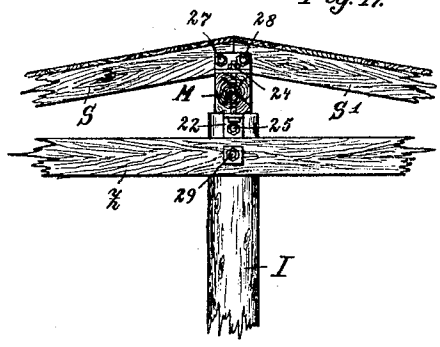
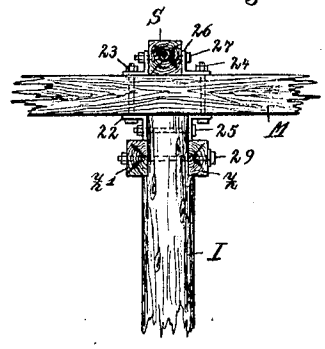


Fig. 18.



Witnesses
A. J. Hadden
A. E. Hathaway

Inventor
Arthur Müller
By his Attorney A. Hadden

ANDREW B. GRAHAM CO., PHOTO-LITHOGRAPHERS, WASHINGTON, D. C.

No. 822,295. PATENTED JUNE 5, 1906.

A. MÜLLER.

FRAME BUILDING.

APPLICATION FILED NOV. 12, 1904.

4 SHEETS—SHEET 4.

Fig. 19.

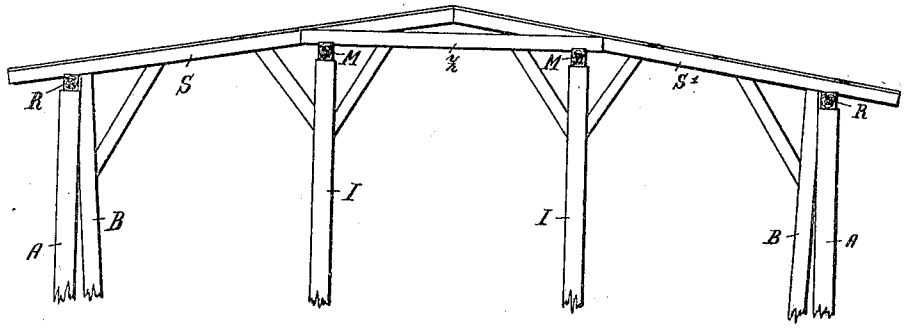


Fig. 20.

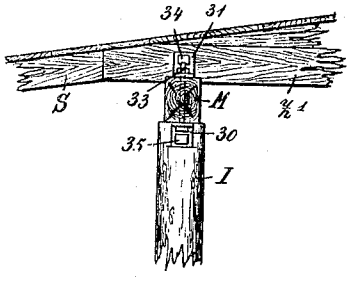


Fig. 21.

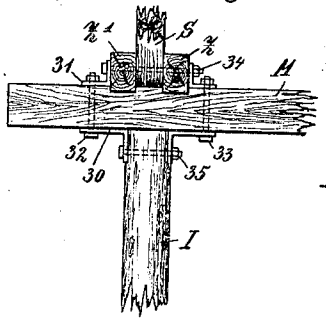


Fig. 22.

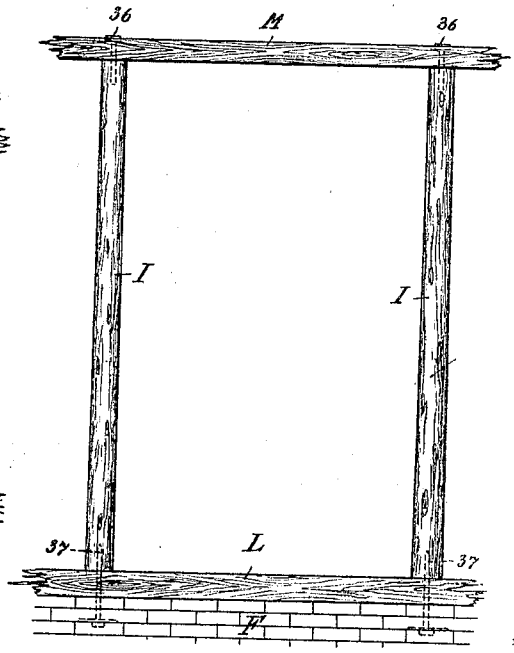
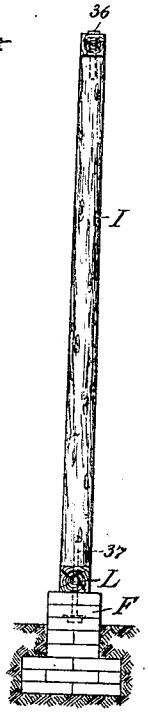


Fig. 23.



Witnesses:
A. Haddaway
A. Hathaway.

Inventor
Arthur Müller
by his Attorney R. Haddaway

ANDREW. B. GRAHAM CO., PHOTO-LITHOGRAPHERS, WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

ARTHUR MÜLLER, OF BERLIN, GERMANY.

FRAME BUILDING.

No. 822,295. Specification of Letters Patent. Patented June 5, 1906.

Application filed November 12, 1904. Serial No. 232,533.

To all whom it may concern:

Be it known that I, ARTHUR MÜLLER, a subject of the King of Prussia, German Emperor, residing at Berlin, in the Empire of Germany, have invented certain new and useful Improvements in Frame Buildings, of which the following is a specification.

This invention relates to barns, stables, barracks, and similar frame buildings, and particularly to the means for assembling the timbers of such buildings with each other and with the foundation in such a manner that the said timbers are connected with each other and with the foundation without the use of framework and that the said timbers can easily be taken apart again. The improvements are therefore particularly well adapted for the erection of temporary barns and the like with the aid of round timber, which need only be dressed at its ends, so that the erection can be effected by unskilled labor with the aid of timber locally obtained, and the buildings can easily be taken to pieces, transported, and reërected at another place.

In the annexed drawings, Figure 1 is an elevation of a barn erected according to this invention. Figs. 2 and 3 are a vertical section and plan view, respectively, of a base for one of the corner-uprights. Figs. 4 and 5 are plan views of bases for center uprights, and Figs. 6 and 7 illustrate from different points of view the manner of erecting an upright. Fig. 8 illustrates the manner of fixing an upright to its base after the former has been erected. Fig. 9 comprises two views of a fixing device, and Figs. 10 to 13 illustrate modifications of the means for erecting and fixing the uprights. Fig. 14 is an elevation of a barn without basic walls, and Figs. 15 and 16 are a cross-section and a longitudinal section, respectively, illustrating the connection of a rafter with a corner-upright and a stringer. Figs. 17 and 18 are similar sections illustrating the connection of a center upright with a rafter and a tie. Fig. 19 is a cross-section of the upper part of a barn provided with two rows of center uprights; and Figs. 20 and 21 are a cross-section and longitudinal section, respectively, illustrating the connection of one of the said uprights with a rafter, tie, and stringer. Figs. 22 and 23 are a side view and cross-section, respectively, illustrating another method of connecting the uprights with the stringers suitable for lighter structures, more particularly for framework buildings.

As is shown in Fig. 2, vertical screw-bolts 3, connected with each other by horizontal ties 4, are embedded in the brickwork of the bases. To the projecting ends of the said bolts angle-irons 5 are connected, by means of nut 6, in the manner shown in the drawings. The vertical parts of the said angle-irons are perforated, as are also the lower ends of the uprights A. The lower end of an upright A is placed between two angle-irons 5 while the said upright is in a horizontal position, Figs. 2, 3, 6, and 11, whereupon a bolt 7 is passed through the holes in the angle-irons and the upright, and the latter is erected by means of pulleys or the like. The holes provided in the angle-irons for the passage of the bolts 7 are either in the form of straight slots 8, Figs. 6 and 8, or in the form of hook-shaped slots 9, Fig. 10, or they are merely circular holes 10, Figs. 11 to 13.

To allow of erecting the uprights, the flat end surfaces of which must stand squarely on the bases, a supporting-iron or key 11, Fig. 9, is inserted into each of the straight slots 8, said key 11 having at its upper end a recess for the bolt 7 and being provided with means for fixing it—for instance, with a screw. To facilitate the insertion and removal of the key, the latter is preferably provided with a rotatable cross-bar 12, which is placed in a vertical position during the insertion of the key into the slot and is then rotated into a horizontal position in such a manner as to prevent the key from falling out of the slot or becoming displaced. When the upright has been erected, the keys 11 are removed from the slots and the upright is lowered onto the base. A nut 13 is then preferably screwed onto the free end of the bolt 7 to clamp the upright in its vertical position. The keys are then preferably inverted and reinserted into the slots 8 above the bolt 7, the cross-bars 12 being turned into horizontal positions when this has been done. This will prevent the upright from being lifted up by a gale.

If angle-irons with hook-shaped slots 9, Fig. 10, are used, the bolt 7 is placed in the notches formed by the upper ends of the slots while the upright is being erected, and the said bolt is lifted out of the said notches

and allowed to slide down the straight parts of the slots when the upright is being lowered onto the base. With this form of slot the bolt can also be locked in its lowered position by placing keys in the upper parts of the slots.

If it is desired to save the expense of producing the slots 8 or 9 and the keys 12, the form of angle-iron shown in Figs. 11 to 13 is used. In this case the angle-irons 5 are only provided with circular holes, but the upright A is provided with a second perforation 14 near its base. Before the erection of the upright the bolt is passed through the hole 10 in the angle-irons 5 and through the said perforation 14, as shown in Fig. 11, and the upright is thereupon erected. While the timber is still supported by the hoisting-gear the bolt 7 is drawn out of the holes 10 and 14 and the upright is lowered onto the base, Fig. 12. If the hole 14 passes through the center of the upright in the same plane as the upper hole 15, the bolt 7 can be reinserted into the holes 10 and passed through the said hole 15 directly the upright has been lowered, a nut 13 being thereupon screwed onto the end of the bolt, Fig. 13. If, however, the lower hole 14 is near one of the sides of the upright, the latter will have to be also laterally displaced in order to move it from the position shown in Fig. 12 into the position in which the hole 15 coincides with the holes 10. The arrangement of the hole 14 near a corner of the upright is of advantage when the wood used is liable to split. The upright can also be laterally deflected during its descent in such a manner that when it reaches the base the hole 15 is in line with the holes 10.

It is obvious that a plurality of uprights connected with each other to form a column can be simultaneously erected in the manner described and that the method may be used for erecting entire walls or sections of walls.

In the examples illustrated in Figs. 1, 14, and 19 the central rows of supports are formed by single uprights I; but at the sides of the building and at the ends of the central rows two-part supports A B are provided, the corner-supports consisting each of three parts A B C. The inclined timbers B and C form acute angles with the principal post A and are connected with the latter by means of bolts 1 and 2, Figs. 15 and 16, at their upper ends and by means of cross-bars *j* at their central and lower parts. The cross-bars *j* can be connected with the timbers by means of screws or tenons. The two-part and three-part supports are always arranged in such a manner that the vertical timber A is on the outside, the inclined timbers B and C being inside. This not only facilitates the construction of the walls, but increases the resistance of the structure to wind-pressure. The plan of the different bases is therefore in accordance with the above, Figs. 3 to 5. On a base destined for the uprights of the central row is fixed only one pair of angle-irons 5, Fig. 5. On the base for the uprights of the side rows, Fig. 4, there is fixed also in the masonry-work a perforated iron or a hook 16 made of iron. On the base for the corner-uprights two such hooks or irons 16 are also fixed. They serve for fixing the auxiliary posts B or B and C when the combined column is erected. They can be arranged singly or also in pairs. In the first-mentioned case there is made in the lower end of the side posts B a vertical notch, which receives the upper end of the iron 16, which is perforated across. Through the cross-hole of the post there is then put a screw-bolt. If the irons 16 are arranged in pairs, the ends of the side posts B and C are fixed to them in the same manner as the lower end of the principal upright A to the angles 5. In lieu of the latter band-irons 16 can also in some cases be used for the principal uprights A. In case there is no time available for preparing foundation masonry the irons 5 and 16 are fixed to piles driven in the earth.

As may be seen from Figs. 15 and 16, the stringer is connected to the principal upright A by angle-irons 17, traversed by bolts 18 and 19. The angle-irons 17 are fixed to the head of the principal upright A by means of the bolt 18. The bolts 18 and 19, put vertically through the bores or holes of the stringer R, serve at the same time for fixing two angle-irons 20 on the upper side of the stringer R. Between these two angle-irons 20 the rafter S is then fixed by means of the horizontal bolt 21. The arrangement is such that the stringer R lies on the head end of the principal upright, flattened to a horizontal, and that the rafter lies above it. It lies also directly on the upper end of the side post or auxiliary post B, Fig. 15.

As shown in Figs. 17 and 18, in erections with only one central row of uprights, Figs. 1 and 14, the ridge-pole M is fixed to central supporting-uprights I by means of the angle-irons 22 and the bolts 23 and 24. The angle-irons are fixed to the head of the upright I by means of the bolt 25. The bolts 23 and 24 pass through vertical bores or holes in the pole M and serve at the same time for fixing two angle-irons 26 on the upper side of the pole M. These angle-irons are advantageously chosen of such a width that they can be provided with two perforations lying side by side for the passage of the bolts 27 and 28. Between the angle-irons 26 are then fixed the end of the rafter S by means of the bolt 27 and the end of the rafter S′ by means of the bolt 28. If both the rafters S and S′ are, moreover, connected to each other by means of the horizontal ties Z and Z′, as may be seen from Figs. 17 and 19, the connection of these ties to the upright I is obtained by

means of the horizontal bolt 29, as shown in Figs. 17 and 18. If, however, two rows of supporting-uprights I are used in place of one central row, as shown in Fig. 19, the ties Z and Z' lie on the stringer M and are connected to the latter and to the rafters S at those points at which is also made the connection of the stringer M to the supporting-uprights I, and this connection is made in a similar manner by means of angle-irons 30 and 31 and bolts 32, 33, 34, and 35, as shown in Figs. 20 and 21. In light constructions, especially in light frame buildings, the connection of the uprights I to the beams M can also be made so that it can be loosened still more easily and rapidly. Figs. 22 and 23 show an example of such a connection. Headed bolts 36 are accordingly suspended in cross-bores of the beam M, the ends of said bolts projecting beneath from the beam being secured at the same time in the upper ends of the uprights I. The rafters and ties are then fixed on the beams M in the manner described. In analogous manner can also be obtained the connection of the uprights to the foundation. Upright metal bolts 37 are for this purpose secured in the masonry foundation F, as may also be seen in Figs. 22 and 23, said bolts projecting from the surface of the foundation to such a height that they not only pierce the sleeper or ground timber L, but enter to a considerable height the lower ends of the uprights I. In buildings the walls of which consist of boards or laths one can arrange the supporting-uprights I thus connected to the beams and the foundation also on the outer rows and fix the boards or laths directly to their outer side. In open erections made in the first instance without walls, Fig. 1, such walls can afterward easily be erected. Where this form of construction is used and has to be taken down, the roof-covering is removed, and it is only necessary to lift the ridge-pole or stringers from the uprights I, whereupon the latter can easily be removed without further preparation from the foundation. This connection allows also that the entire roof can be raised and be laid on auxiliary standards, so that damaged uprights I can be exchanged for new ones, whereupon the roof is again lowered.

I claim as my invention—

1. In a frame building the combination of a base, square-ended uprights adapted to rest on said base, means for pivoting said uprights to the base during the erection thereof so constructed that their squared ends swing free of the base or may be lowered to contact therewith and means for holding the uprights down upon said base when lowered into place.

2. In a frame building the combination of a base, square-ended uprights adapted to rest on said base when erected, apertured angle-irons secured to said base, and horizontal bolts passing through the lower ends of the uprights and engaging the apertures in the angle-irons, said apertures being so contrived that the squared ends of the uprights swing free of the base during erection and can be lowered onto the base when erected together with removable keys insertible in said apertures below or above said bolts accordingly.

3. A frame building comprising in combination a series of bases, apertured angle-irons secured to said bases, a series of square-ended uprights, horizontal bolts passing through the lower ends of the uprights and adapted to engage the apertures in the angle-irons, temporary means of support for the uprights during their erection so that their ends swing free of the base, said means also serving for holding down said uprights when erected, a roof ridge-pole and stringers supported by the uprights, means for connecting the uprights to said ridge-pole and stringers, rafters carried by said ridge-pole and stringers, means for connecting said ridge-pole and stringers to the rafters, and a roof carried by said rafters substantially as described.

4. In a frame building the combination of a series of bases, slotted angle-irons secured to said bases, a series of supporting-uprights in groups of varying number, horizontal bolts passing through the lower ends of certain of the uprights and adapted to engage the slots in the angle-irons, keys adapted to be inserted in said slots for supporting the bolts during the erecting of the uprights and afterward removed and reinserted for holding down said bolts, and additional irons embedded in the bases to which the lower ends of other uprights of the groups are attached, substantially as described.

5. In a frame building the combination of a series of bases, angularly-slotted angle-irons secured to said bases, a series of supporting-uprights in groups of varying number, horizontal bolts passing through the lower ends of certain of the uprights and adapted to engage the angular slots in the angle-irons, and additional irons embedded in the bases to which the lower ends of other uprights of the groups are attached, substantially as described.

6. A frame building comprising in combination a series of bases, apertured angle-irons secured to said bases, a series of supporting-uprights in groups of varying number, horizontal bolts passing through the lower ends of certain uprights of the groups and adapted to engage the apertures in the angle-irons, additional irons embedded in the bases to which the lower ends of other uprights of the groups are attached, a roof ridge-pole and stringers supported by the uprights, angle-irons and transverse bolts for connecting the

uprights to said ridge-pole and stringers, rafters carried by said ridge-pole and stringers, angle-irons and transverse bolts for connecting said ridge-pole and stringers to the rafters, ties connecting the uprights and rafters, and a roof carried by said rafters substantially as described.

In witness whereof I have signed this specification in the presence of two witnesses.

ARTHUR MÜLLER.

Witnesses:
WOLDEMAR HAUPT,
HENRY HASPER.