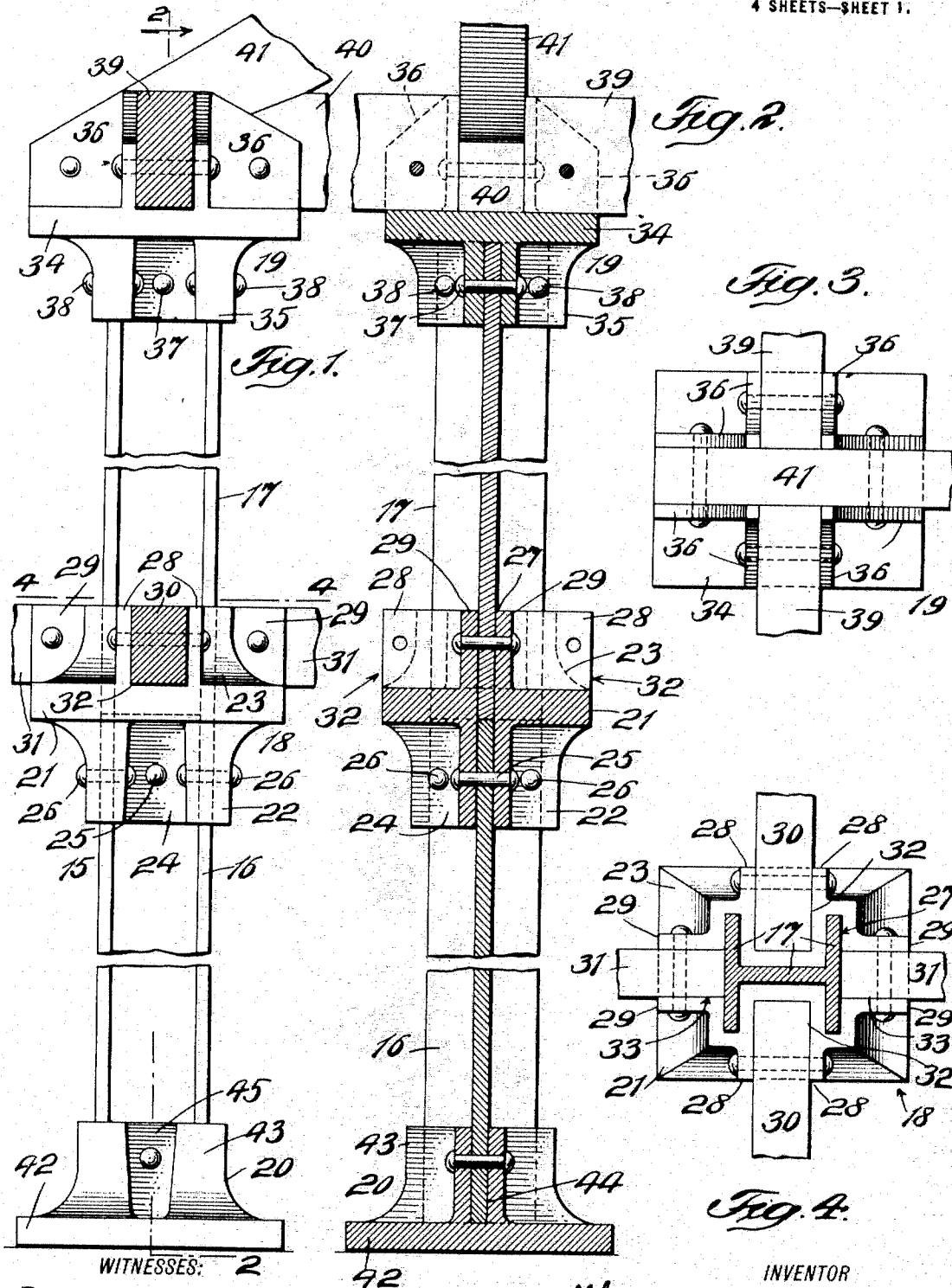


1,258,409.

Patented Mar. 5, 1918.  
4 SHEETS—SHEET 1.

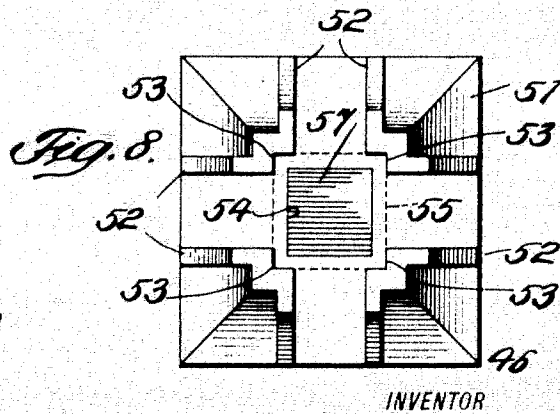
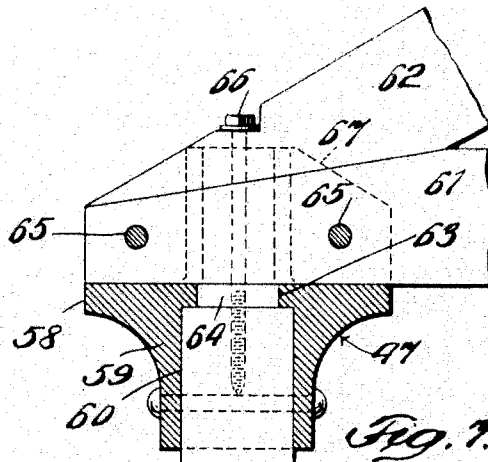
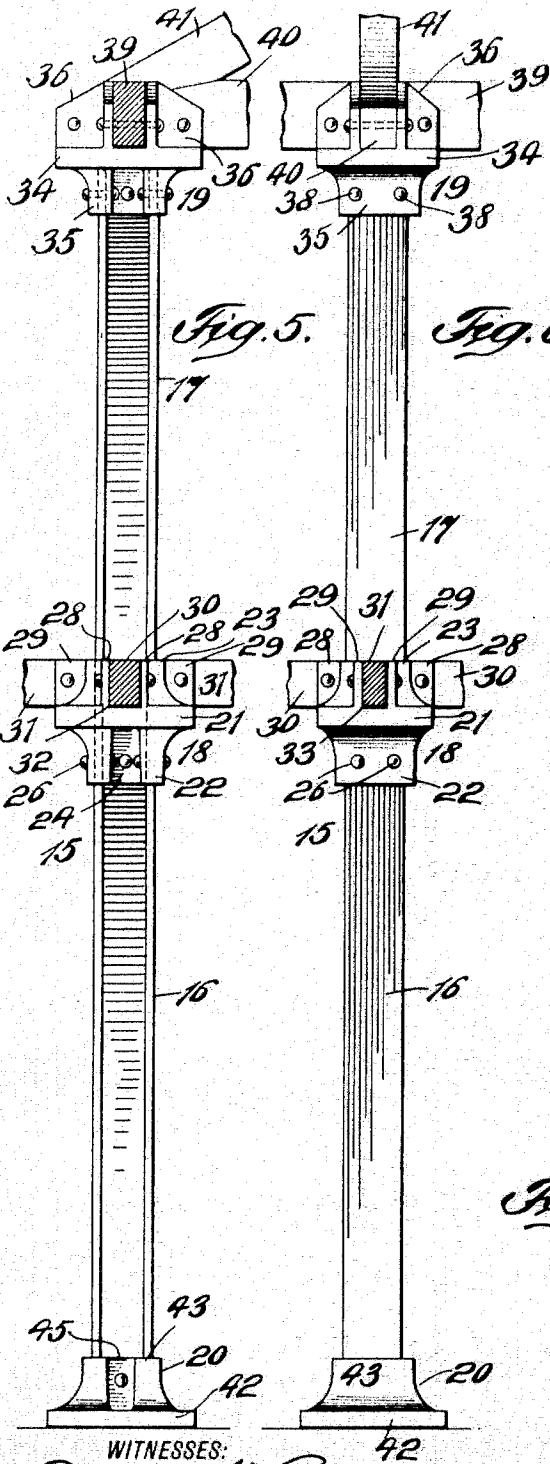


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4 SHEETS—SHEET 2.

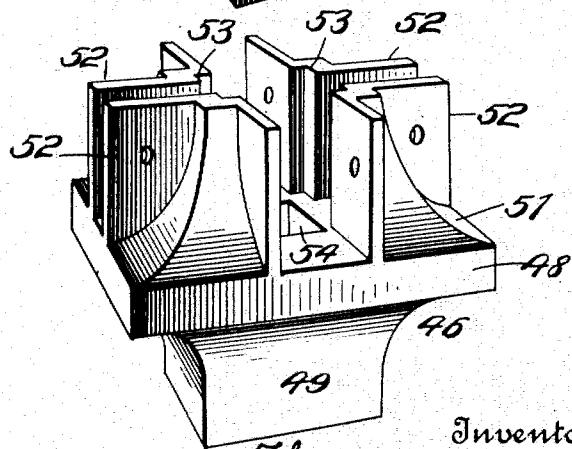
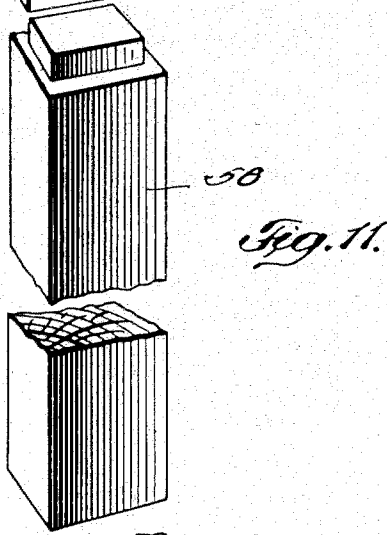
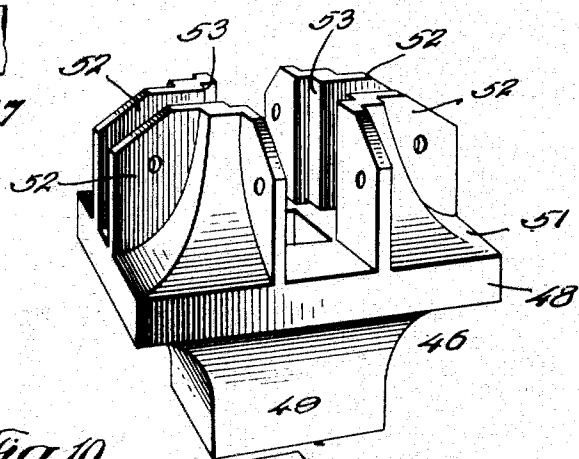
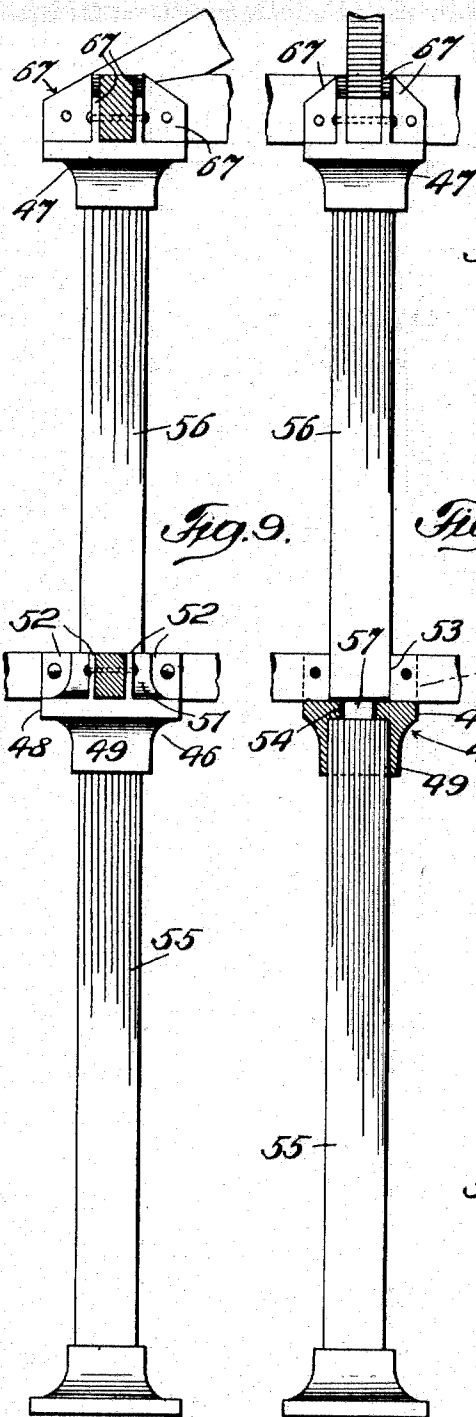


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4 SHEETS—SHEET 3.

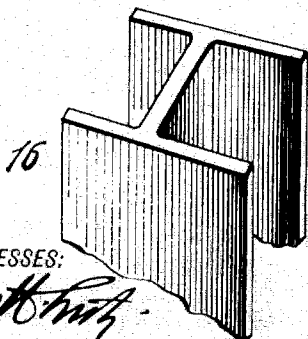


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T. HILL.  
BUILDING STRUCTURE.  
APPLICATION FILED AUG. 28, 1915.

4 SHEETS—SHEET 4.



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# UNITED STATES PATENT OFFICE.

THOMAS HILL, OF JERSEY CITY, NEW JERSEY.

## BUILDING STRUCTURE.

1,258,409.

Specification of Letters Patent.

Patented Mar. 5, 1918.

Application filed August 28, 1915. Serial No. 47,755.

*To all whom it may concern:*

Be it known that I, THOMAS HILL, a citizen of the United States, and a resident of Jersey City, in the county of Hudson and State of New Jersey, have invented certain new and useful Improvements in Building Structures, of which the following is a specification.

The invention pertains more particularly to novel sockets adapted to the columns, beams and girders in architectural structures and to a novel building structure embracing said sockets, columns, beams and girders. The sockets are of an integral character and have for their object the dispensing with a large number of pieces at present employed in building structures. The sockets of my invention are each integral and may receive the adjoining ends of two vertical beams or sections of the column and also the adjoining ends of the horizontal transverse and longitudinal beams of a building. The columns or column sections may be formed of rolled beams of I-shape in cross-section and the transverse and longitudinal beams may be of wood, if desired, or the vertical column sections may be of wood or some of them may be of rolled beam structure and others of wood.

The invention will be fully understood from the detailed description hereinafter presented, reference being had to the accompanying drawings, in which:

Figure 1 is a transverse section, partly broken away, through a building structure embodying my invention;

Fig. 2 is a longitudinal section, partly broken away, through a portion of the same, taken on the dotted line 2—2 of Fig. 1;

Fig. 3 is a top view, partly broken away, looking down on the upper end of Fig. 1;

Fig. 4 is a horizontal section through a portion of the structure, taken on the dotted line 4—4 of Fig. 1;

Fig. 5 is a view corresponding with Fig. 1, but on a smaller scale and with the column sections shown complete;

Fig. 6 is a side elevation of the same, taken from the left hand side of Fig. 5, the floor and roof beams being shown as partly in section and partly broken away;

Fig. 7 is an enlarged transverse vertical section, partly broken away, through the upper portion of a building structure em-

bodying my invention and illustrating the employment of the wooden column sections in lieu of rolled beam column sections;

Fig. 8 is a top view of the cap-socket employed at the upper end of the lower column section, shown in Fig. 7, the end of the column section being also shown;

Fig. 9 is a transverse sectional view, partly broken away, corresponding with Fig. 5 but illustrating the employment of rectangular wooden column sections;

Fig. 10 is an elevation taken from the left hand side of Fig. 9, with one metal cap socket shown in vertical section;

Fig. 11 is a view in perspective partly broken away, showing one of my cap sockets for the upper end of a column section and one of said sockets for the lower end of the column section, with the column section interposed between said sockets preparatory to being engaged therewith;

Fig. 12 is a perspective view on a larger scale of my cap socket as constructed to receive the adjoining ends of rolled I-beam column sections, portions of said sections also being shown as positioned preparatory for engagement with said cap socket, and

Fig. 13 is a vertical transverse section through the same, the column sections, partly broken away, being shown in position with their adjoining ends abutting against each other within the socket.

I illustrate my invention in a sectional portion of the building, it being unnecessary to illustrate the entire building, and in the structure there will be employed a number of vertical columns, horizontal transverse and longitudinal beams, roof beams, trusses and the like, all being as numerous as the size of the building may require. The features comprising my invention will correspond throughout the building and will be understood from the units illustrated. In the drawings, referring more particularly to Figs. 1 to 6 inclusive and Figs. 12 and 13, the vertical column 15 is shown as composed of two end to end abutting rolled I-beams 16, 17 united at their meeting portions by a cap-socket 18, the column having on its upper end the cap socket 19 and at its lower end being seated and secured within the socket 20. The sockets 18, 19 and 20 are each in one integral casting and each is recessed to

conform to the shape of the beam sections 16, 17 in cross-section.

The socket 18 comprises a base member 21, a lower depending portion 22 and an upper portion 23 rising upwardly from said base member 21. The depending portion 22 contains a socket which receives and conforms in cross-section with the upper end of the rolled beam section 16, and said portion 22 at opposite sides is recessed inwardly, as at 24, to closely engage the opposite faces of the web of the beam 16 and avoid the employment of an undue quantity of metal in said portion 22. The portion 22 closely receives the web and flanges of the beam 16 and said beam at its upper end is secured within said portion 22 by rivets 25, 26, the rivet 25 extending through the opposite faces of the portion 22 and through the web of the beam 16, as shown, and the rivets 26 being extended through the sides of the portion 22 and the flanges of the beam 16. The upper portion 23 of the socket 18 has a recess 27 in it of the same shape as the beam section 17 in cross-section, as shown in Fig. 4, this recess being of I-shape and closely receiving the lower end of said beam section 17. The socket 18 in its upper portion is formed with longitudinal parallel flanges 28 at opposite sides of its center and with parallel longitudinal flanges 29 at the other opposite sides of its center, and said flanges form open top spaces or recesses respectively receiving the longitudinal and transverse floor beams 30, 31, respectively. The recesses 32 for the beams 30 extend nearly in to that portion of the socket or recess 27 which receives the web of the beam 17, and the recesses 33 for the beams 31 open into those portions of the recess 27 which receive the flanges of the beam 17. The flanges 28 stand at right angles to the flanges 29, and hence the floor beams 30 extend at right angles to the floor beams 31, and said beams 30, 31 are secured within their recesses in the socket 18 by bolts or rivets extending through the flanges 28, 29 and said beams, as shown. The upper portion of the socket 18 is recessed out at its corner portions so as to create the flanges 28, 29 and avoid the use of an undue quantity of metal as well as to permit the rivets to conveniently be applied for securing the beams 30, 31 in position. The beams 30, 31 representing floor beams, may be made out of wood. It will be seen on reference to the drawings that the base member 21 of the socket 18 is of substantial thickness and not only constitutes a flooring for the spaces or recesses between the flanges 28, 29, but extends outwardly beyond said flanges and connects the adjacent flanges 28, 29, where they stand at right angles to each other, at the corners of said base member 21. The downwardly

extending portion 22 and the upwardly extending portion 23 of the socket 18 merge into the base member 21 on curved lines extending out to the edges and corners of said base member 21, as shown in Fig. 4, and this construction affords a socket 18 of very great strength and durability, especially at the flanges 28, 29 and in the portions 22, 23. The beams 30, 31 are held at their ends within the spaces between the flanges 28, 29 and said flanges extend out to the outer edges of the base member 21, and it will be seen that the upper outwardly curved portion of the depending part 22, where said part merges into the base 21, affords considerable strength to said base 21 enabling it to securely support the beams 30, 31 of the character employed in large building structures.

The socket 19 has a base member 34, a depending lower portion 35 and four right angle flanges 36 at the upper side of said base-member. The depending portion 35 corresponds exactly with the depending portion 22 of the socket 18, and said portion 25 contains a recess conforming with and receiving the upper end of the beam section 17, and said end of said beam section is secured within said portion 35 by rivets 37, 38, the rivet 37 passing through the faces of said portion 35 and the web of the beam 17 and said rivets 38 passing through sides of said portion 35 and through the flanges of the beam 17. The right angular flanges 36 at the upper side of the base member 34 form open top recesses which open into each other at the center of said base-member. Between the longitudinal flanges 36 are secured longitudinal roof-beams 39 and between the lateral flanges 36 are secured the transverse roof beams 40 and inclined beams 41.

The cap-section 18 receives the adjoining ends of two beam sections 16, 17 and also the adjoining ends of longitudinal and transverse floor beams 30, 31. The bottom of the recess 27 for the beam section 17 is open so that said beam section may abut against the upper end of the beam section 16 about the base member 21, as indicated by the dotted lines in Fig. 1, and it is one of the purposes of my invention that the column sections shall abut one against the other within the confines of the sockets.

The socket 19 differs in its upper portion from the construction of the upper portion of the socket 18, since said socket 19 is not intended to receive a column section upon it, but transverse and longitudinal beams or girders connected with the roof construction.

The socket 20 is a base-socket having a supporting base member 42 and an upwardly projecting portion 43 containing a recess 44 to receive the lower end of the column section 16. The lower end of the



column section 16 is secured within the socket 20 by riveting or the like and the opposite sides of said socket 20 are recessed inwardly, as at 45, so as to dispense with the use of an undue quantity of metal and permit of the socket and beam section being secured together in a convenient manner by rivets.

In Figs. 7 and 8 I illustrate modified constructions of sockets as substitutes for the sockets 18, 19 when columns of wood are to be made use of, and I number the modified sockets 46, 47, respectively. The socket 46 has a base member 48, a depending vertical lower portion 49 containing a rectangular vertical recess 50 and upper portion 51 formed with right angular flanges 52 at whose adjoining edges is defined a rectangular vertical recess or socket 53 which extends downwardly to the base member 48. The base member 48 has within its vertical portion a vertical opening 54 which connects the recesses 50, 53, but is less in area than either of said recesses in cross-section, thereby forming shoulders extending around the upper and lower edges of the opening 54. The recess 50 closely receives the upper end of the rectangular wooden column section 55 and the recess 53 receives the lower end of the rectangular wooden column section 56. The upper end of the lower column section 55 is reduced, as at 57, to enter and fill the opening 54 in the base member 48 and to permit the lower end of the upper column section 56 to abut against it. The socket 46 corresponds in a large degree with the socket 18, but is adapted to receive wooden column sections, while the socket 18 is intended to receive adjoining ends of rolled beam column sections. Between the longitudinal members of the flanges 52 are secured longitudinal floor beams and between the lateral flanges 52 are secured the transverse floor beams substantially in the manner illustrated in Fig. 5. At their inner ends the right angular flanges 52 are formed with reentrant angles, as shown in Fig. 8, to receive and permit said flanges to closely engage all of the angles or corners of the rectangular column section 56.

The socket 47 has a base member 58, a depending portion 59 containing a vertical rectangular socket 60 and a flanged upper portion receiving the roof beams 61, 62, this flange-portion corresponding with the upper portion of the socket 19. Within the base member 58 is formed an opening 63, less in dimensions than the body of the column section 56, and the upper end of the column section 56 is cut away to form a reduced neck 64 close fitting said opening 63. The socket 47 is riveted upon the upper end of the beam section 56 and the several parts about said socket 47 are further secured together by rivets 65 extending trans-

versely through the beam 61 and also by the vertical screw 66 which extends downwardly through the beam 62 and beam 61 and enters the upper end of the column section 56.

I designate the upper flanges of the socket 47 by the numeral 67 in Figs. 9 and 10. Figs. 9 and 10 illustrate the employment of sockets for column beam sections made of wood and illustrate the entire column, whereas in Fig. 7 only a portion of the column is shown.

At the lower portion of Fig. 11 I illustrate in perspective the socket 46 and at the upper portion of Fig. 11 I illustrate in perspective a corresponding socket, while between the two sockets I illustrate a portion of one of the wooden column beam sections. In instances in which the building is more than two stories in height, there will be a number of the sockets 46 used, one being between each two column beam sections, and hence I present Fig. 11 to show the use of two of the sockets 46, the upper one being intended to receive the lower end of a column beam section for a higher story. The upper socket shown in Fig. 11 corresponds in construction with the socket 47, and hence if a two story building was contemplated, the two sockets shown in Fig. 11 would answer for such structure the same as I illustrate in Figs. 9 and 10. It is of advantage to have all of these cap-sockets correspond with one another, since then the work of erecting a building is largely one of assembling the parts.

The invention will be fully understood from the foregoing description without further extended explanation. It will be seen that the column sections may be either of rolled beams or of wood, and obviously the lower stories of the building may have rolled column sections and upper stories wooden column sections. The sockets permit of a building being erected very quickly and with the minimum number of parts. The sockets avoid the use of a large number of pieces riveted together at present employed in the erection of steel frames of buildings. The cap sockets are strong and durable and they conveniently not only receive the adjoining ends of column sections but also the adjoining ends of the transverse and longitudinal floor beams.

What I claim as my invention and desire to secure by Letters-Patent, is:

1. In a building structure, vertical column sections, transverse and longitudinal beams and integral cast metal sockets for the adjacent ends of said column sections and beams, said sockets each comprising a base member, an upper portion extending upwardly and centrally of said base and containing a vertical recess to receive the lower end of a column section, a lower portion extending downwardly and centrally of said

base and containing a recess to receive the upper end of a column section, and lateral flanges integral with said base and extending upwardly therefrom and being in pairs at right angles to each other and extending to the outer portions of said base and receiving between them the adjacent ends of said beams supported on said base, said upper and lower portions merging on laterally extending lines into said base, and said base being extended beyond the outer sides of said flanges and connecting the adjacent flanges which stand at right angles to each other.

15 2. In a building structure, vertical column sections, transverse and longitudinal beams and integral cast metal sockets for the adjacent ends of said column sections and beams, said sockets each comprising a  
20 base member, an upper portion extending upwardly and centrally of said base and containing a vertical recess to receive the lower end of a column section, a lower portion extending downwardly and centrally of said  
25 base and containing a recess to receive the upper end of a column section, and lateral flanges integral with said base and extending upwardly therefrom and being in pairs at right angles to each other and extending  
30 to the outer portions of said base and receiving between them the adjacent ends of said beams supported on said base, said upper and lower portions merging on laterally extending lines into said base, and said  
35 base being extended beyond the outer sides of said flanges and connecting the adjacent flanges which stand at right angles to each other, and the upper vertical recess in said  
40 opposite sides to the spaces between the adjacent pairs of lateral flanges.

3. In a building structure, vertical column sections, transverse and longitudinal beams and integral cast metal sockets for the adjacent ends of said column sections  
45 and beams, said sockets each comprising a base member, an upper portion extending upwardly and centrally of said base and containing a vertical recess to receive the  
50 lower end of a column section, a lower portion extending downwardly and centrally of said base and containing a recess to receive the upper end of a column section, and lateral flanges integral with said base and  
55 extending upwardly therefrom and being in pairs at right angles to each other and extending to the outer portions of said base and receiving between them the adjacent ends of said beams supported on said base,  
60 said upper and lower portions merging on laterally extending lines into said base, and said base being extended beyond the outer sides of said flanges and connecting the adjacent flanges which stand at right angles  
65 to each other, and the recesses in said upper

and lower portions opening into each other so that the adjacent ends of the column sections may abut about said base member.

4. In a building structure, vertical I-beam column sections, transverse and longitudinal  
70 beams and integral cast metal sockets for the adjacent ends of said column sections and beams, said sockets each comprising a base member, an upper portion extending upwardly from said base and containing a  
75 vertical recess conforming to and snugly receiving the lower end of one of said column sections, a lower portion extending downwardly from said base and containing a  
80 recess conforming to and snugly receiving the upper end of one of said column sections, and lateral flanges integral with said base and extending upwardly therefrom and being in pairs at right angles to each  
85 other and extending to the outer portions of said base and receiving between them the adjacent ends of said beams supported on said base, said upper and lower portions merging on laterally extending lines into  
90 said base, said base being extended beyond the outer sides of said flanges and connecting the adjacent flanges which stand at right angles to each other, and said lower portion being recessed inwardly at the opposite  
95 faces of the web of the column section so as to permit the riveting of said socket to the upper end of said column section by rivets extending at right angles to each other through the web and flanges of  
100 the column section.

5. In a building structure, vertical I-beam columns, transverse and longitudinal beams and integral cast metal sockets for said columns and beams, said sockets each comprising  
105 a base member, a lower portion extending downwardly and centrally of said base and containing a recess conforming to and snugly receiving the upper end of one of said columns and lateral flanges integral with said base and extending upwardly  
110 therefrom and being in pairs at right angles to each other and extending to the outer portions of said base and receiving between them the adjacent ends of said beams supported on said base, the upper end of said  
115 lower portion merging on laterally extending lines into said base below the spaces formed between said flanges, said base being extended beyond the outer sides of said flanges and connecting the adjacent flanges  
120 which stand at right angles to each other, and said downwardly extending lower portion being recessed inwardly at the opposite faces of the web of the column so as to permit the riveting of said socket to the upper  
125 end of said column by rivets extending at right angles to each other through the web and flanges of the column.

6. In a building structure, vertical columns, transverse and longitudinal beams  
130



and integral cast metal sockets for said columns and beams, said sockets each comprising a base member, a lower portion extending downwardly and centrally of said base  
5 and containing a recess to receive the upper end of one of said columns, and lateral flanges integral with said base and extending upwardly therefrom and being in pairs at right angles to each other and extending  
10 to the outer portions of said base and receiving between them the adjacent ends of said beams supported on said base, the upper end of said lower portion merging on later-

ally extending lines into said base, and said base being extended beyond the outer sides of said flanges and connecting the adjacent flanges which stand at right angles to each other.

Signed at New York, in the county of New York, and State of New York, this 20 27th day of August, A. D. 1915.

THOMAS HILL.

Witnesses:

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CHAS. C. GILL.