

(No Model.)

2 Sheets—Sheet 1.

S. W. ROBINSON.

METAL PILING AND SUBSTRUCTURE.

No. 377,332.

Patented Jan. 31, 1888.

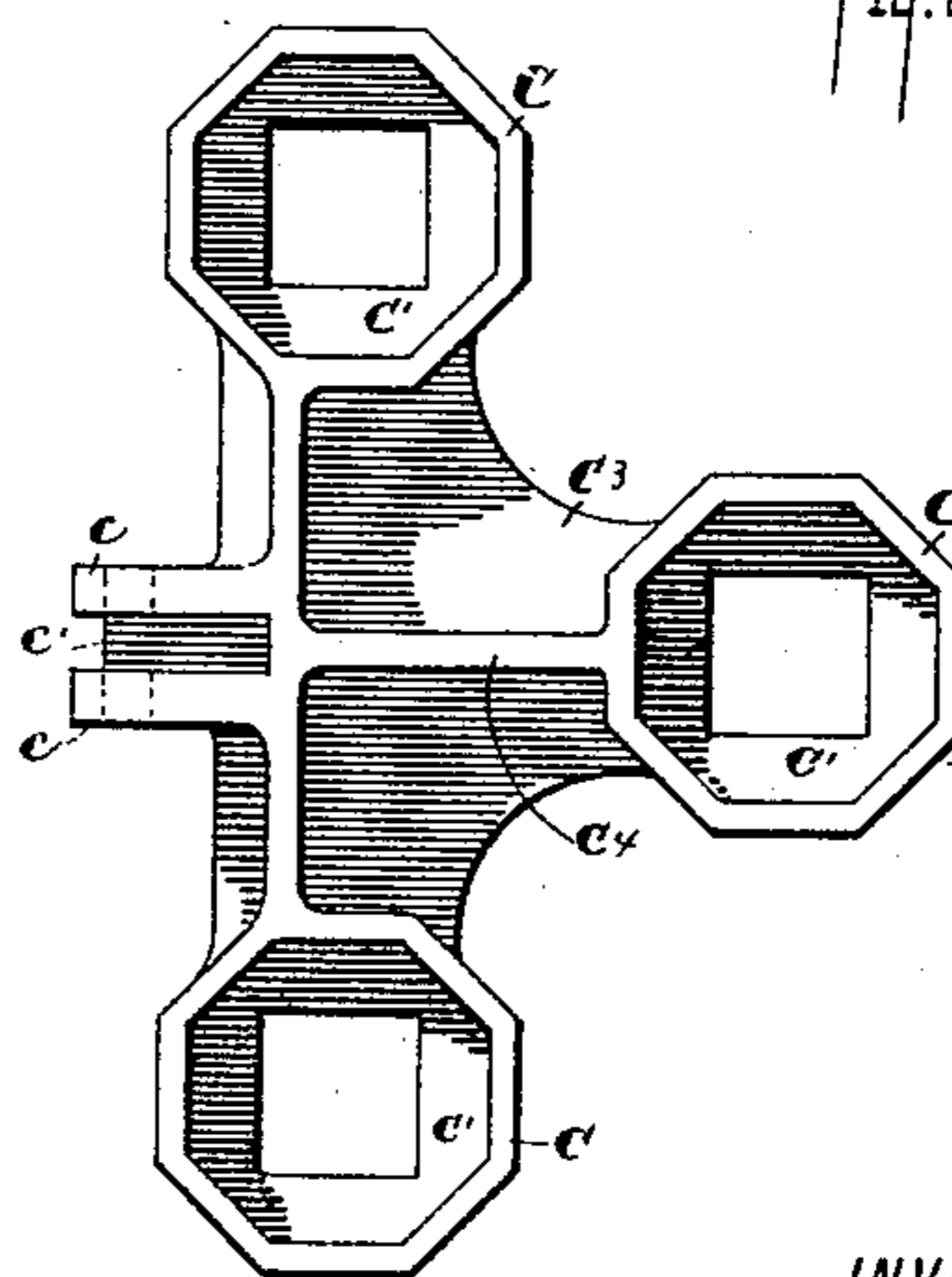
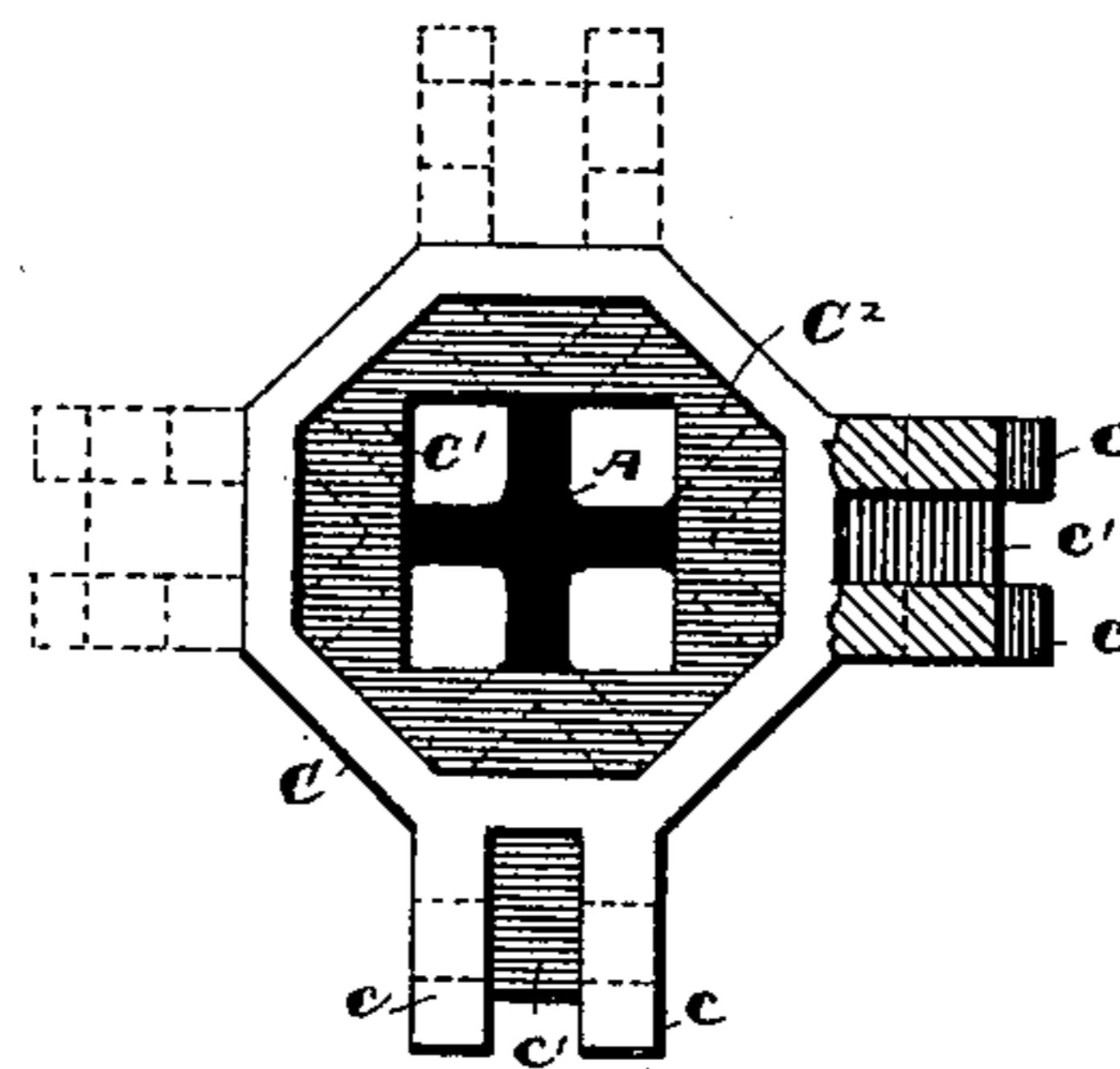
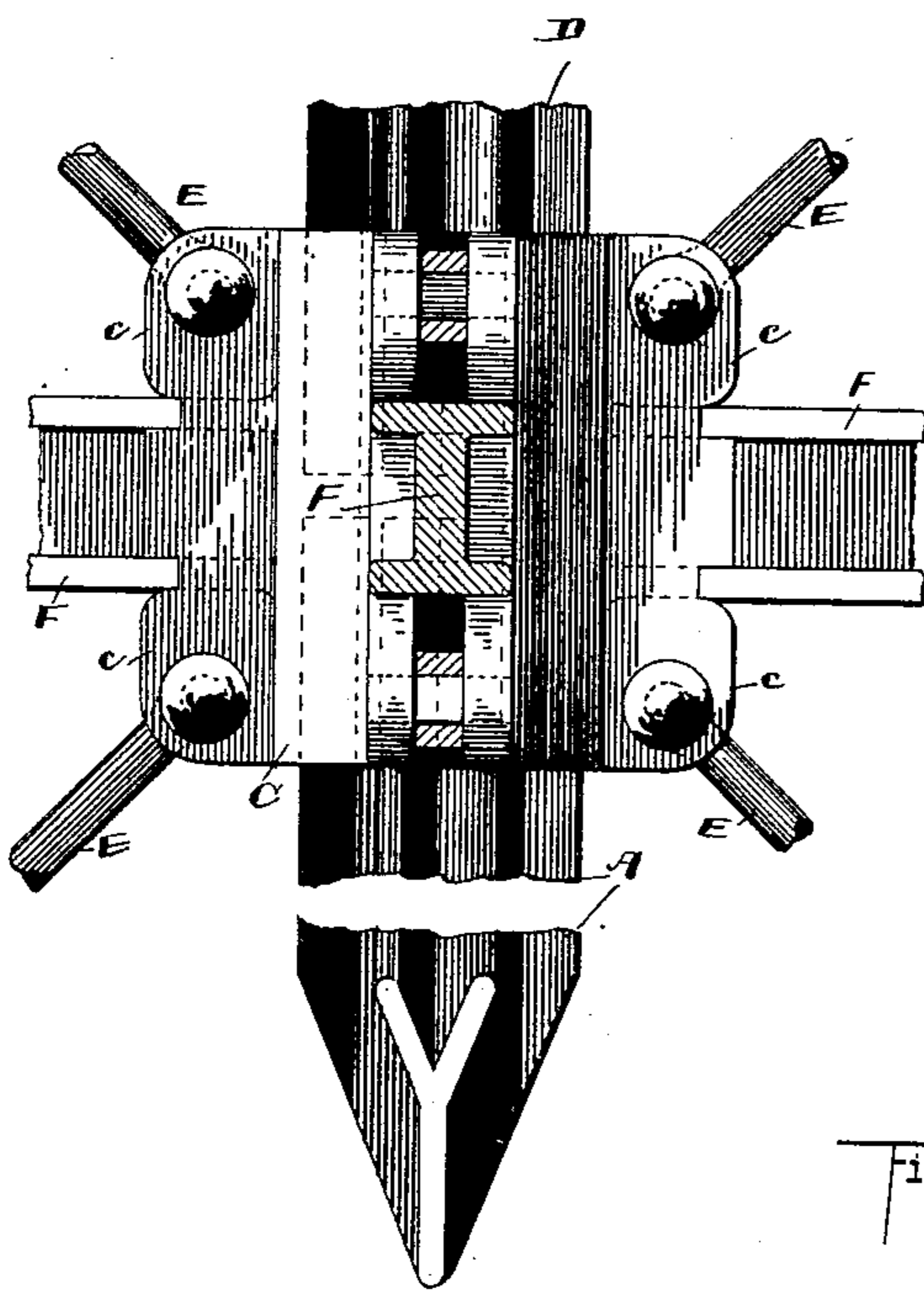
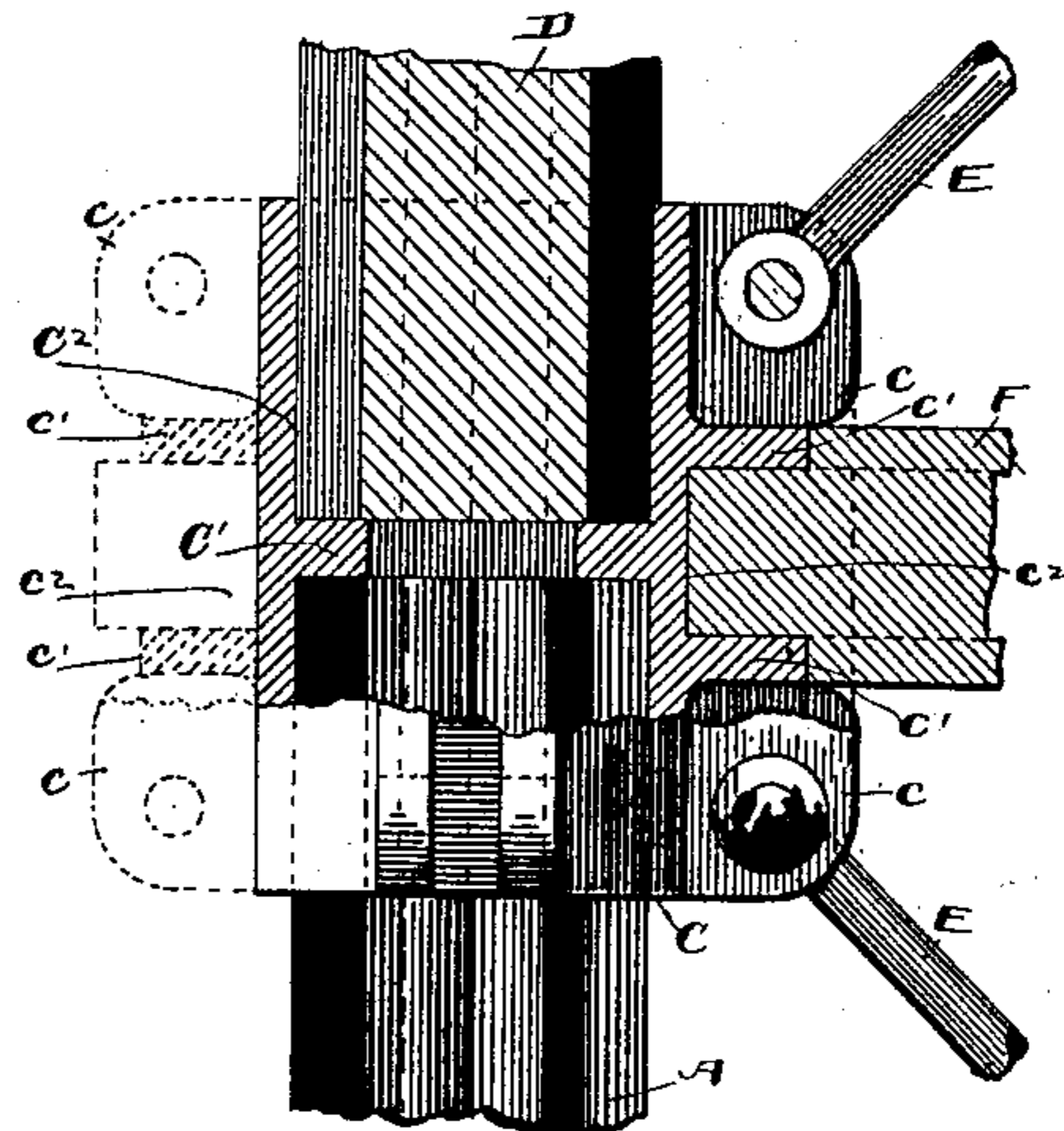
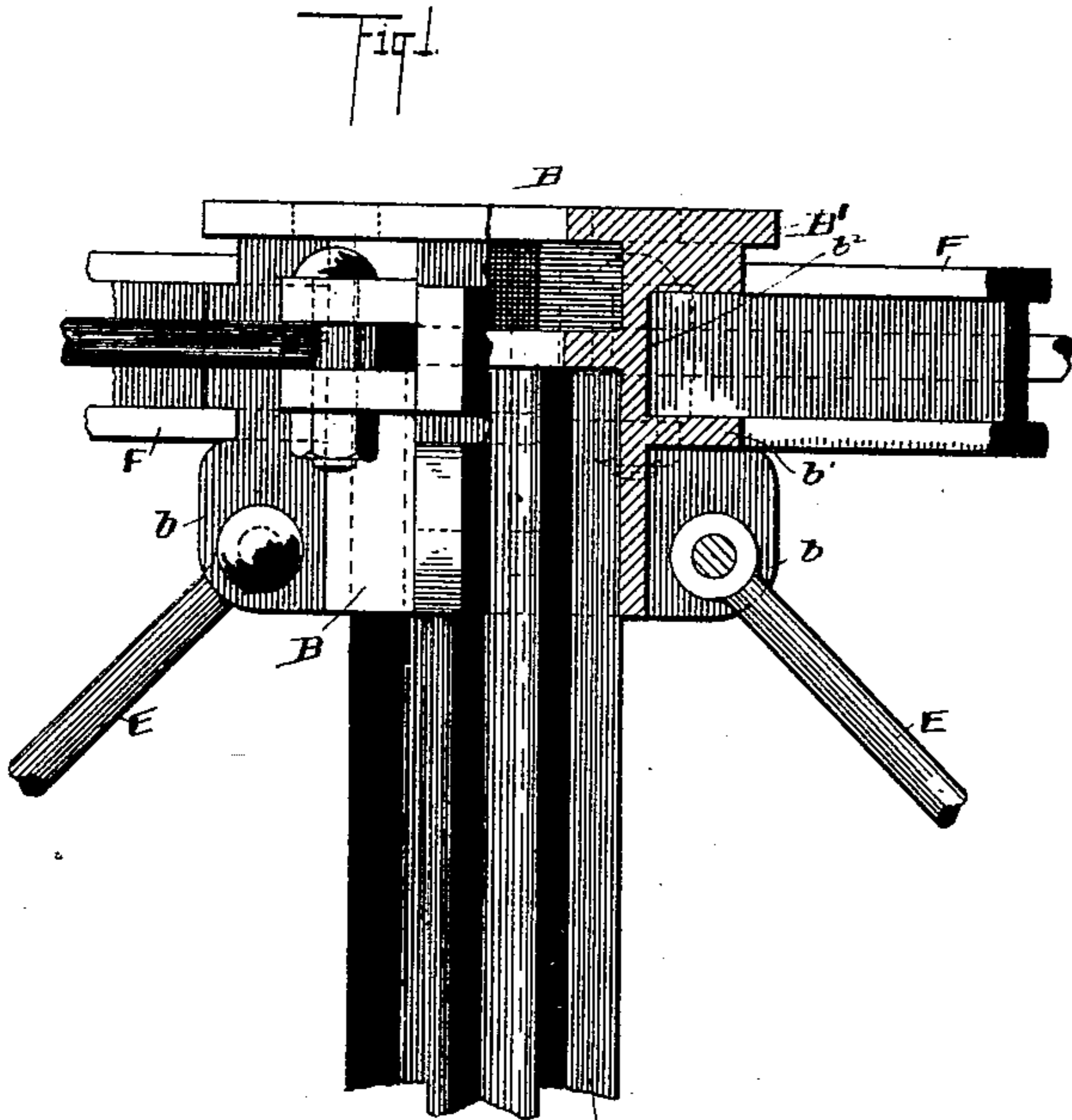


Fig. 4

WITNESSES

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INVENTOR

*S. W. Robinson*

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(No Model.)

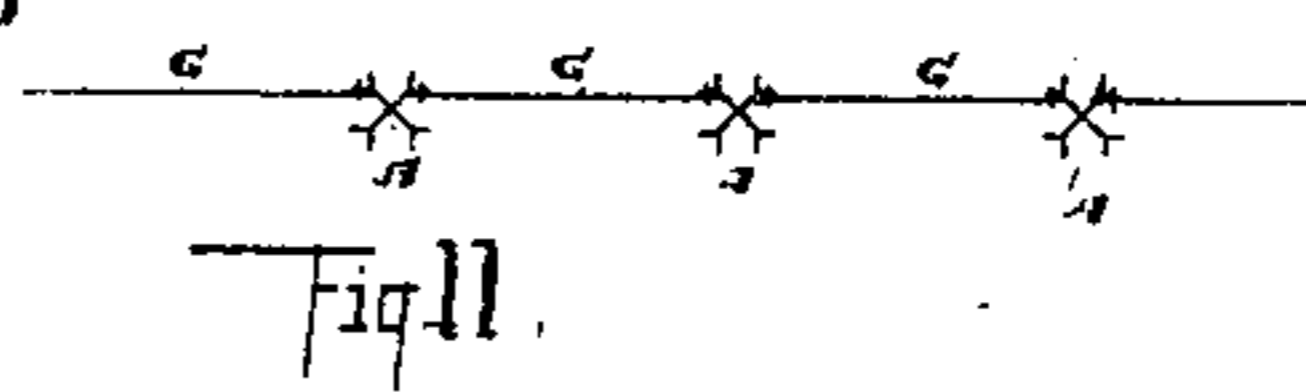
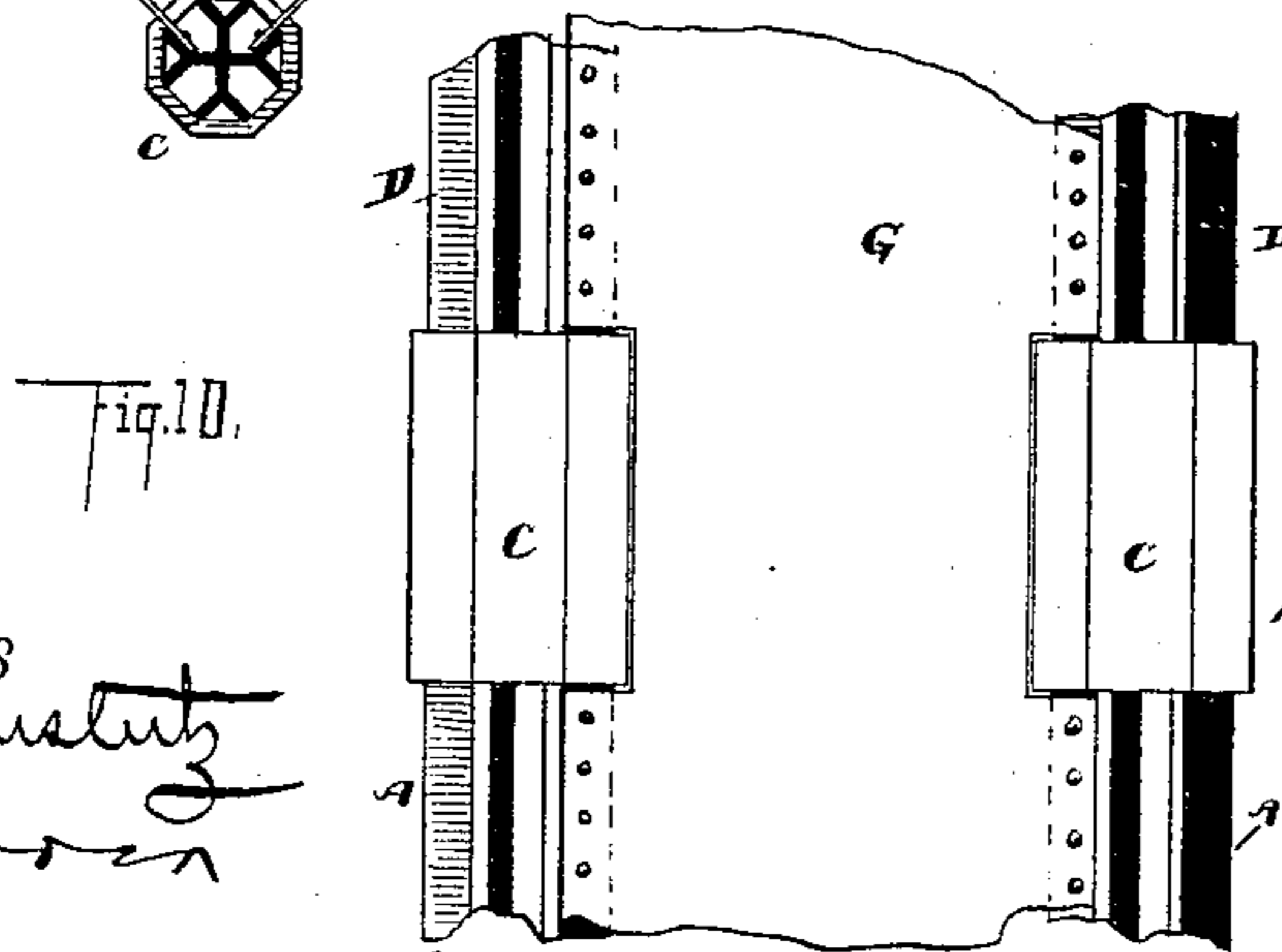
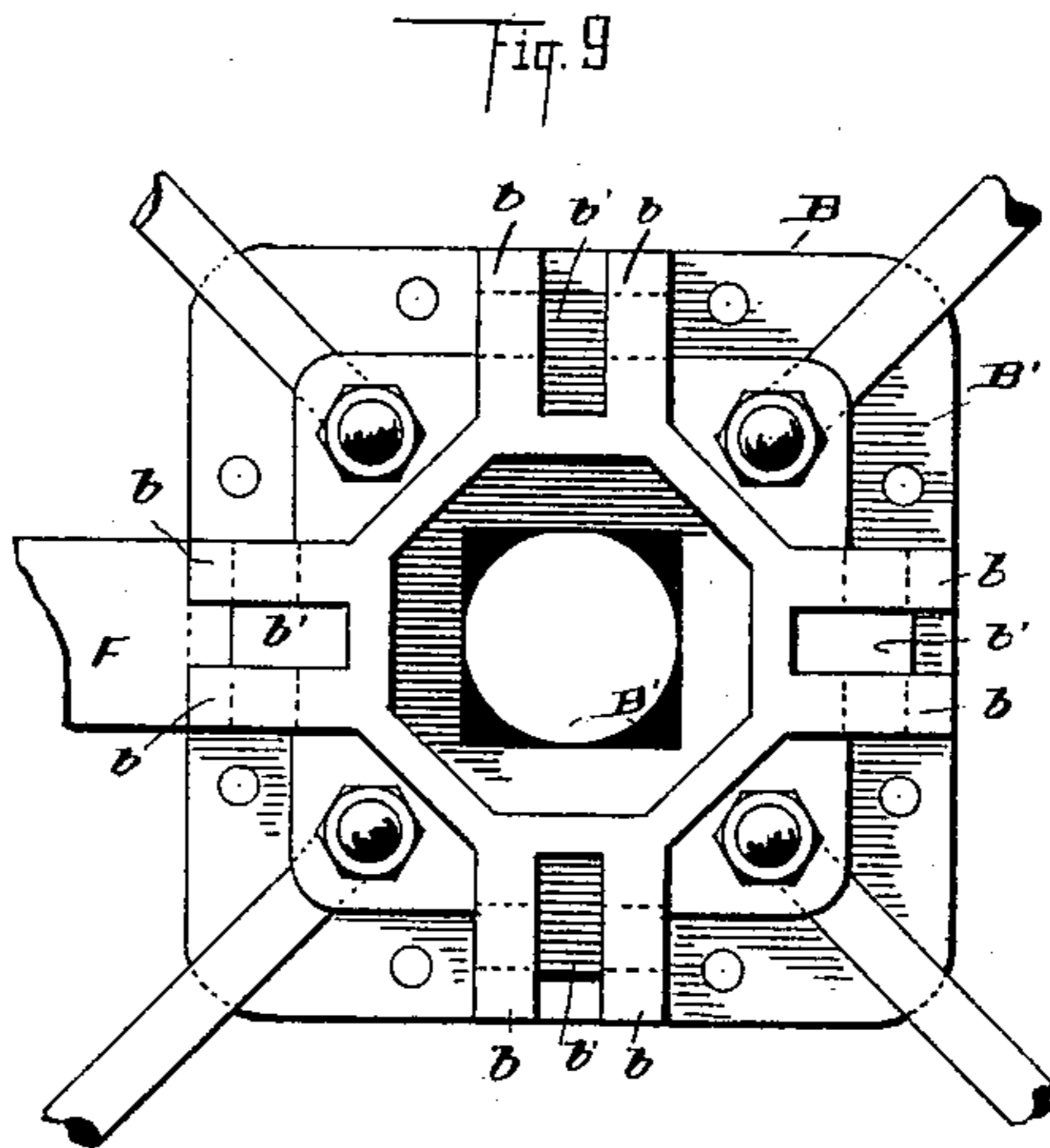
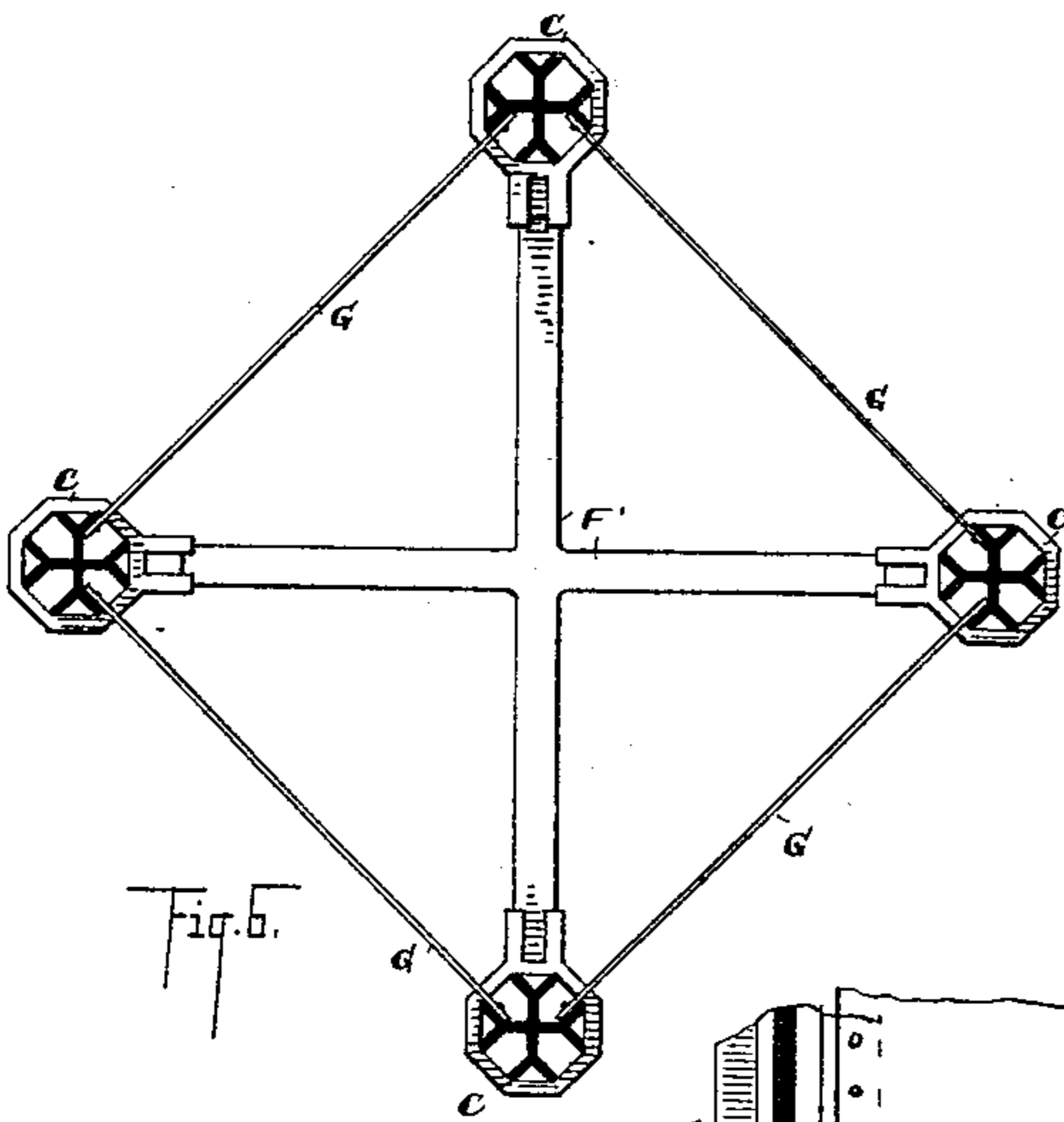
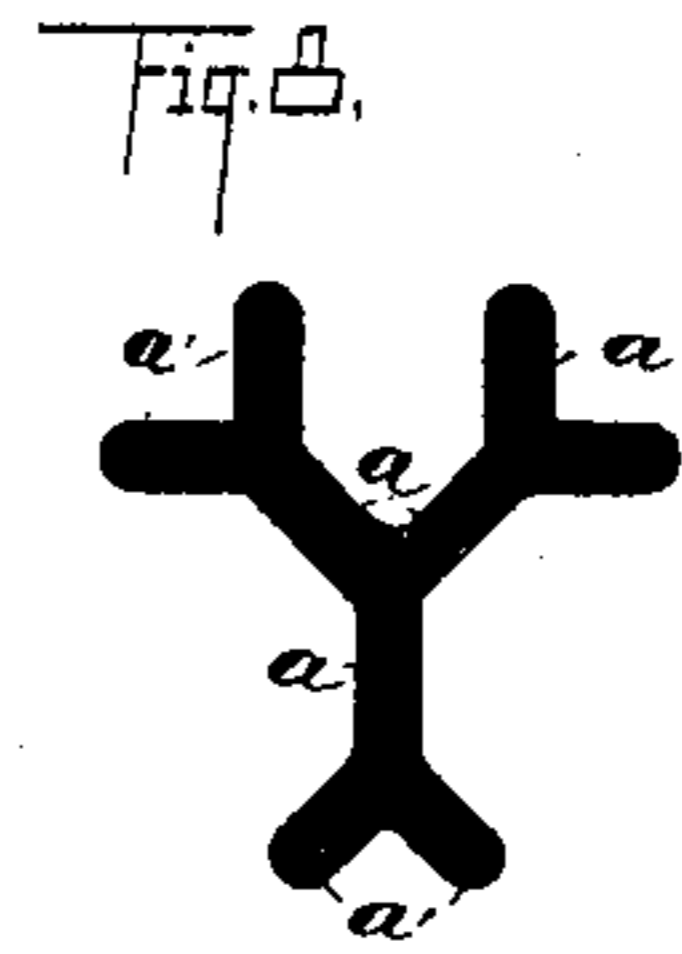
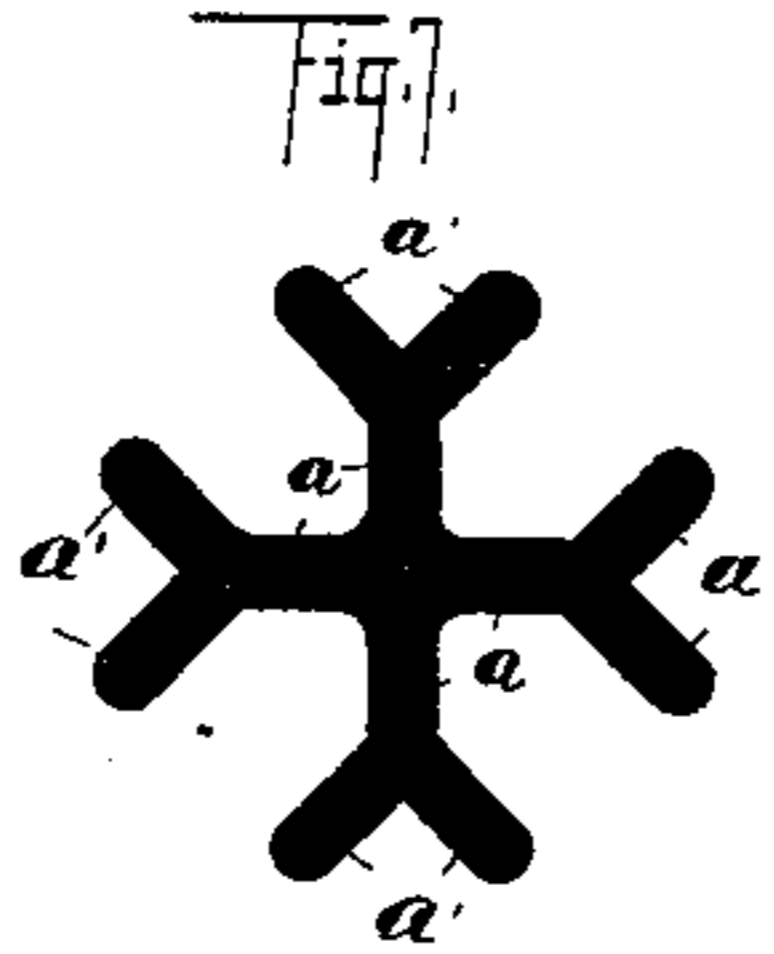
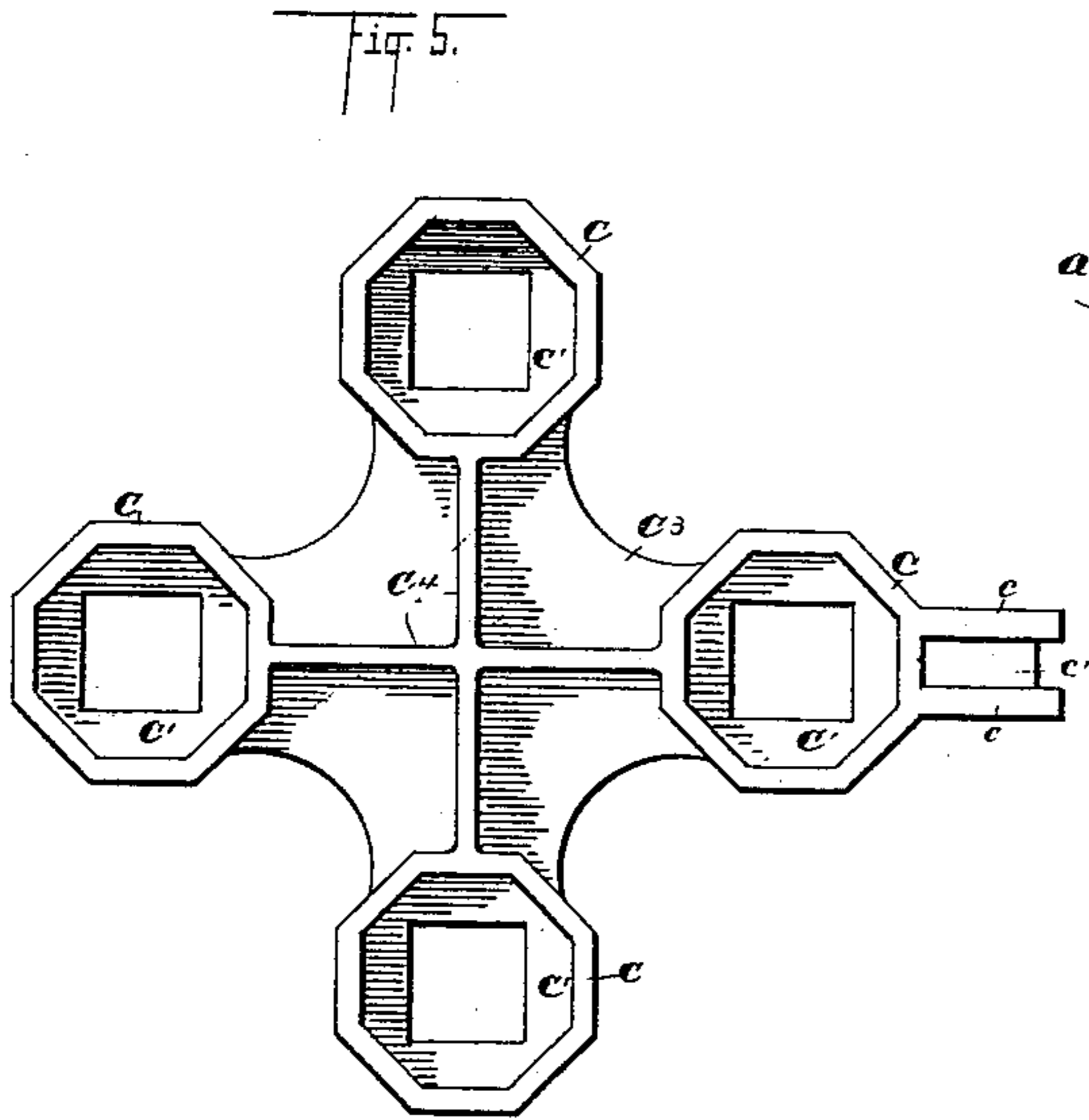
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WITNESSES  
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# UNITED STATES PATENT OFFICE.

STILLMAN W. ROBINSON, OF COLUMBUS, OHIO.

## METAL PILING AND SUBSTRUCTURE.

SPECIFICATION forming part of Letters Patent No. 377,332, dated January 31, 1888.

Application filed July 27, 1886. Serial No. 209,257. (No model.)

*To all whom it may concern:*

Be it known that I, STILLMAN W. ROBINSON, of Columbus, in the county of Franklin and State of Ohio, have invented certain new and useful Improvements in Metal Piling and Substructure; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same.

My invention relates to improvements in metal substructure for docks, piers, abutments, and similar purposes, in which are employed metal webbed piles, the same having divergent wings or flanges extending from the extremes of the webs, to the end that an enlarged surface of the pile is thus had to engage the ground, and consequently the pile is held with greater firmness, and the divergent wings or flanges presenting at various angles form convenient means of attaching brace-rods, tie-beams, plates, or other mechanism that may be found necessary to the substructure. Metal caps are employed that fit over the heads of the piles, the same having flanges, to which may be bolted any timber or structure that is to be built on the piles. Metal couplings are employed that fit over the head of the pile the same as the caps, the couplings having above the pile a socket presenting upward for receiving the end of a column or timber endwise and in line with the pile. Both caps and couplings have internal flanges to bear or rest on the ends of the piles and columns and external laterally-projecting ribs, preferably set in pairs, said ribs forming sockets for receiving struts, and convenient means for attaching brace-rods and other necessary mechanism.

When groups of piles are driven close together, multiple caps and couplings are employed, in which a series of caps and couplings, corresponding in number and relative position with the groups of piles, are connected and made integral by a web or flange. When the piles forming a group are somewhat further separated, a spider-strut is employed for connecting the couplings. In case of columns being employed above the respective piles and coupled as aforesaid, metal plates may be riveted to the wings of the piles and columns, said plates being notched around the respective couplings, and by means of which

the columns and piles are firmly bound together.

In the accompanying drawings, Figure 1 is an elevation of a pile, column, cap, and coupling in position, portions being broken away. Fig. 2 is an elevation in section of a coupling. Fig. 3 is a plan of a coupling. Fig. 4 is a plan of a triple coupling. Fig. 5 is a plan of a quadruple coupling. Fig. 6 is a plan in section of a cluster of columns with couplings connected by a spider-strut, showing also plates connecting the columns outside. Figs. 7 and 8 are plans of piles used in carrying out my invention. Fig. 9 is a bottom plan of a single cap. Fig. 10 is a side elevation showing piles and columns with metal sheet-plates attached, the latter extending past the coupling. Fig. 11 shows a series of piles set in line and in such relative position as to bring the wings continuous for coupling the piles with plates.

A represents a metal pile, this form being usually made of cast-iron, the same having any desired number of radial webs *a*, (see Figs. 7 and 8,) the said webs terminating in divergent wings or flanges *a'*. With such construction a very strong pile is had for the weight of metal employed and a large area of pile-surface engages the ground, thereby causing the pile to stand firmly. Also, the wings *a'* form convenient means of attaching brace-rods, tie-bars, metal plates, or other mechanism required, for instance, in connecting the piles for filling, &c.

B are metal caps made to fit over the heads of the respective columns, said caps having broad flanges *B'*, for supporting any structure that may be built upon said columns, the projecting flanges forming convenient means for securing such structure by bolts.

C are metal couplings that fit over the heads of the piles. These couplings are usually of considerable length, and midway have an internal rib, *C'*, that abuts the head of the pile, leaving a socket, *C''*, presenting upward, for receiving the end of a column that may be placed on top of the pile in line with the latter, such columns *D* corresponding in cross-section with the piles over which the respective columns are placed. Both caps and couplings have, respectively, laterally-projecting ribs, respectively *b* and *c*, usually arranged in pairs, with cross-ribs *b'* and *c'*, the ribs form-

ing suitable means of attaching brace-rods E, and forming sockets, respectively,  $b^2$  and  $c^2$ , for receiving the end of the metal strut F.

When the piles are driven in groups and close together, multiple caps and couplings are employed, in which the individual caps or couplings are connected and made integral by webs or arms—for instance, as shown in Figs. 4 and 5, where webs  $C^3$  and  $C^4$  are shown connecting the couplings C. The multiple caps are of course connected in the same manner by webs.

When the piles are separated some little distance, spider-struts may be employed—for instance, as shown at F', Fig. 6.

In Fig. 10 metal plates G are shown riveted to the wings of the piles and columns, the plate being notched around the coupling, as shown. With such construction the columns and piles are held firmly together. The plates, of course, may be re-enforced at the top or at the joints thereof by T-irons, angle-plates, or other suitable device. The piles may be placed so that the wings thereof present in any desired direction. In Fig. 11 are shown a series of piles set in line and connected with the plates.

In carrying out my invention, the piles may be made in a variety of forms in cross-section and set in different combinations to make about any shaped structure required.

What I claim is—

1. A cast-metal pile consisting of a body

made up of a series of webs terminating in laterally-projecting wings or flanges, the said webs and flanges being integral.

2. The combination, with a metal pile or column, of a metal cap provided with an internal flange or flanges to bear or rest upon the upper end of the divergent wings of the pile or column, substantially as set forth.

3. The combination, with a group of metal piles and caps arranged on the same, substantially as described, of a spider-strut adapted to engage the seats on the respective caps, substantially as set forth.

4. The combination, with a group of metal piles, columns set, respectively, upon the piles, and couplings connecting the respective piles and columns, of a spider-strut adapted to engage the seats on the respective couplings, substantially as set forth.

5. The combination, with metal piles and columns, the same having webs and divergent wings or flanges, and coupled substantially as described, of metal sheets, the same being secured to opposing wings on adjacent piles and columns and notched over the couplings, substantially as set forth.

In testimony whereof I sign this specification, in the presence of two witnesses, this 26th day of June, 1886.

STILLMAN W. ROBINSON.

Witnesses:

ALBERT E. LYNCH,  
CHAS. H. DORER.