

No. 685,768.

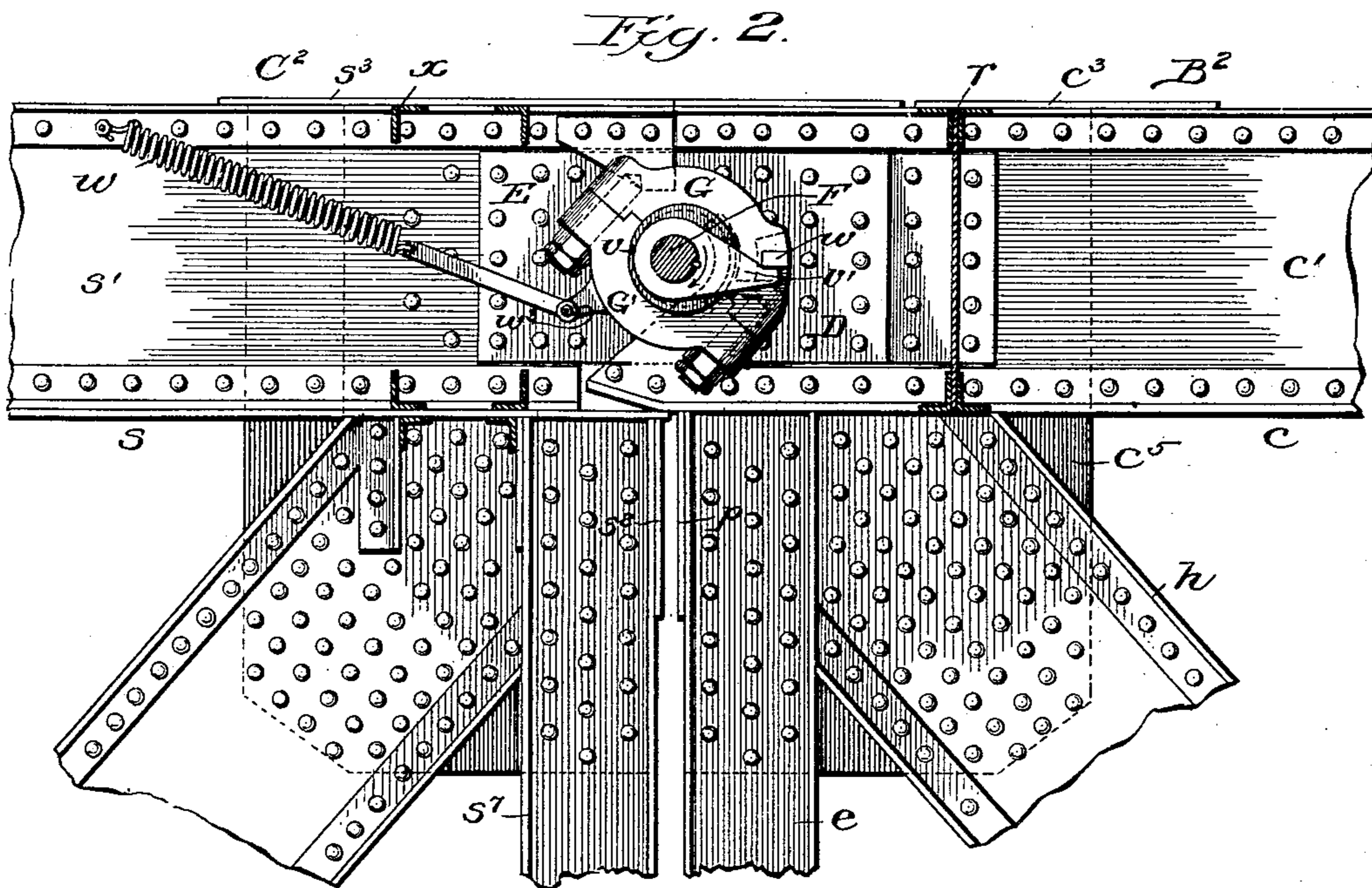
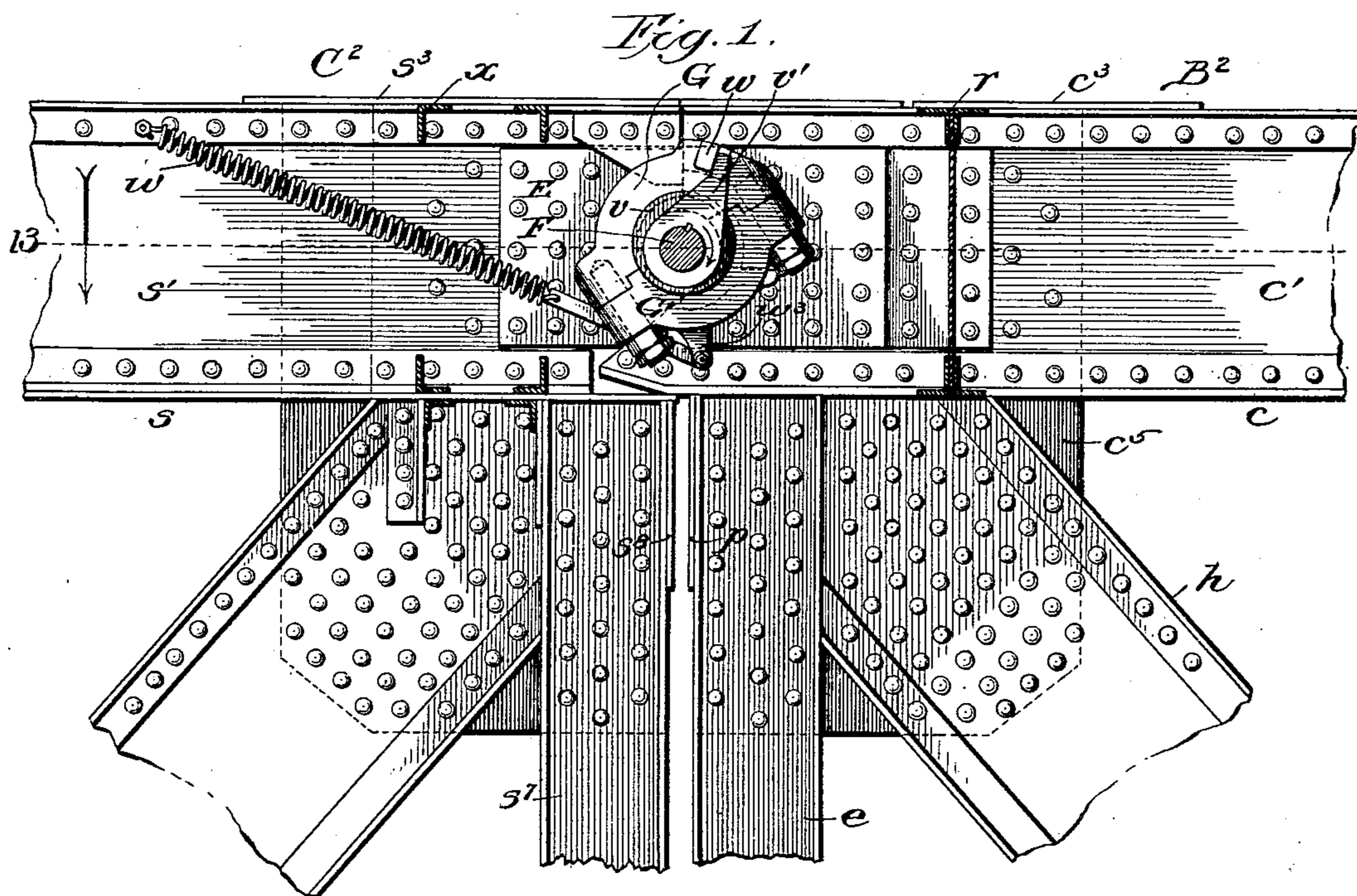
Patented Nov. 5, 1901.

C. L. KELLER.
BRIDGE.

(Application filed Mar. 25, 1901.)

(No Model.)

5 Sheets—Sheet 1.



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C. L. KELLER.
BRIDGE.

(Application filed Mar. 25, 1901.)

(No Model.)

5 Sheets—Sheet 2.

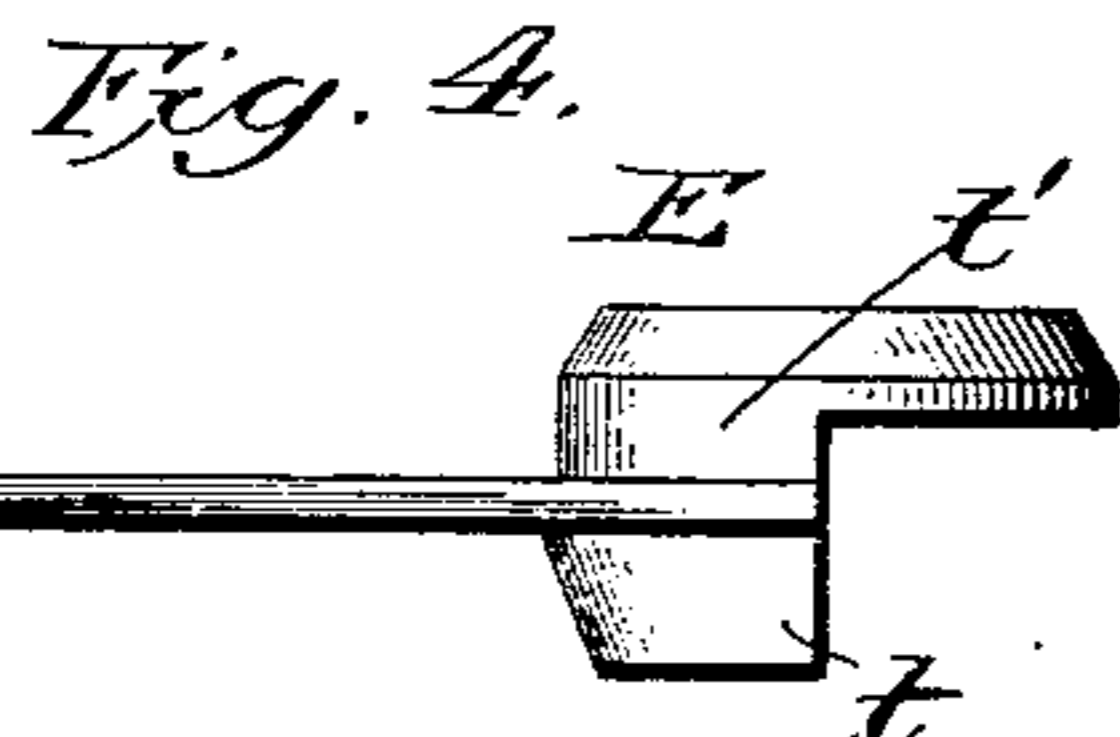
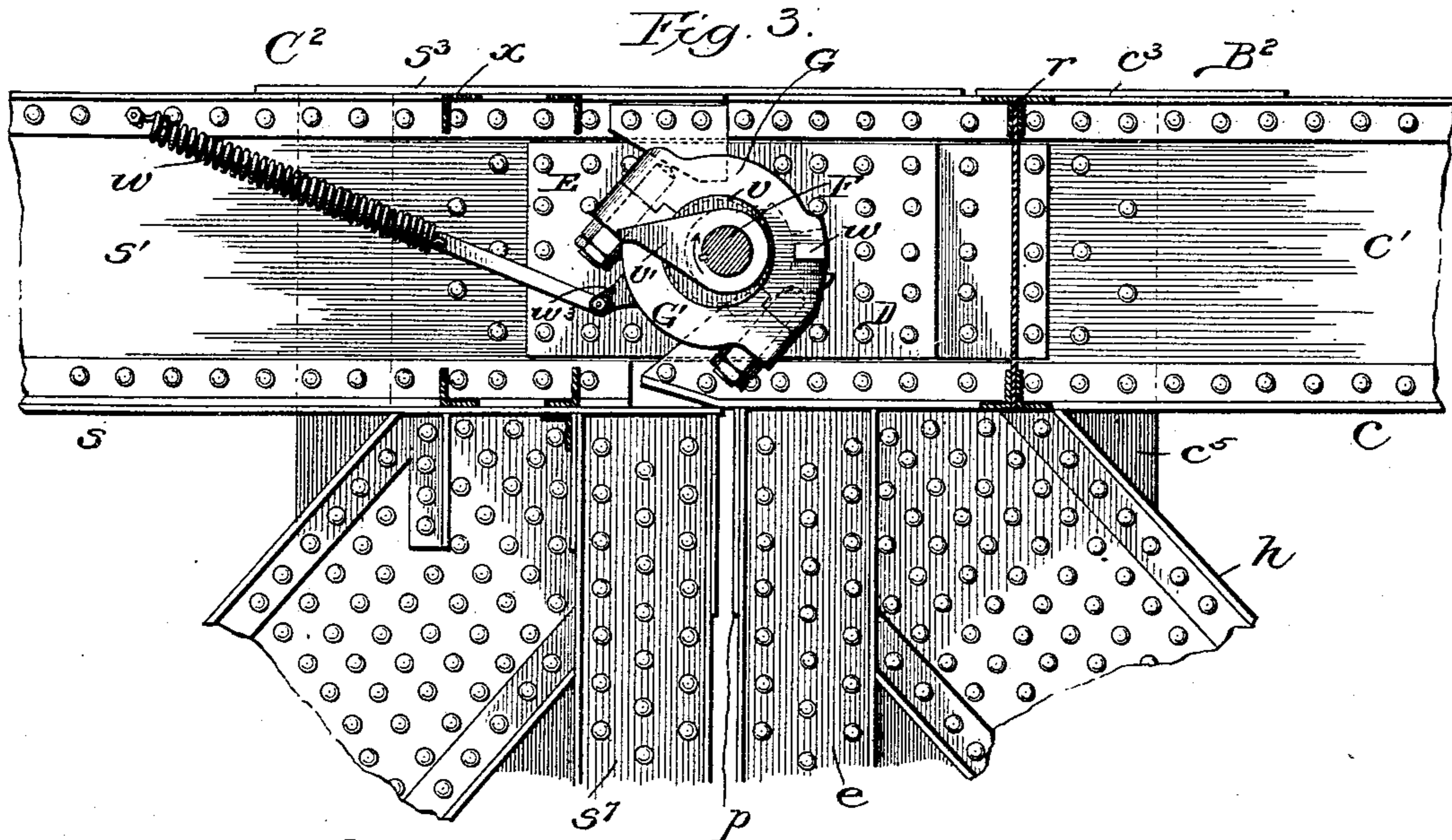


Fig. 5.

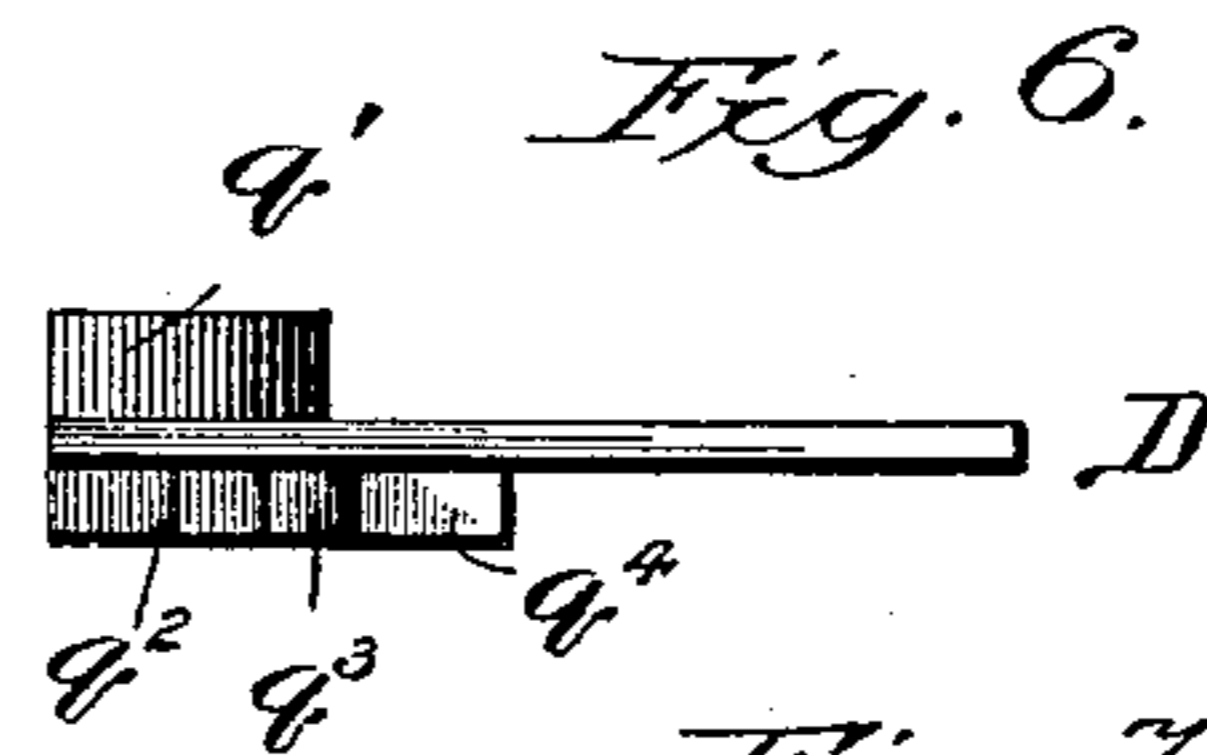
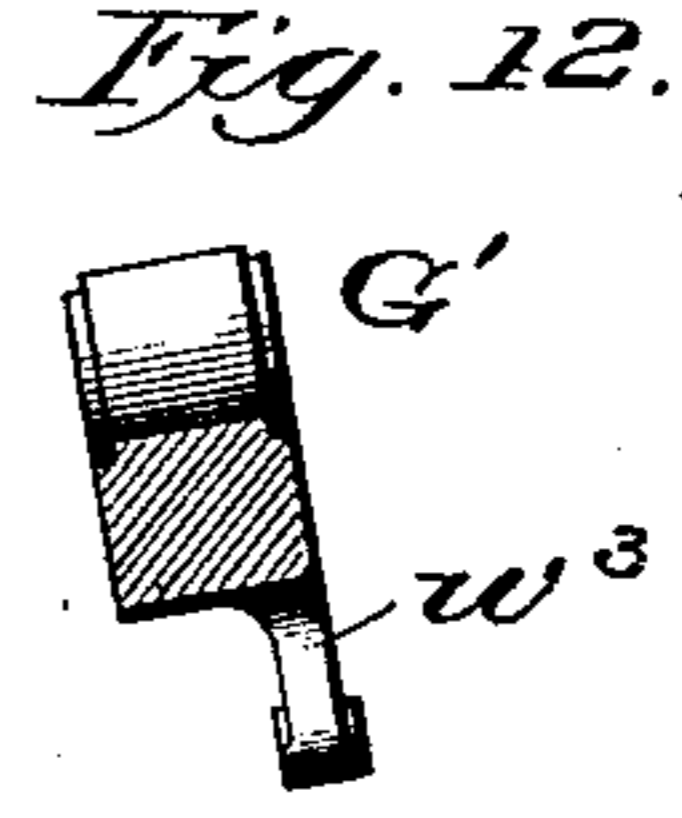
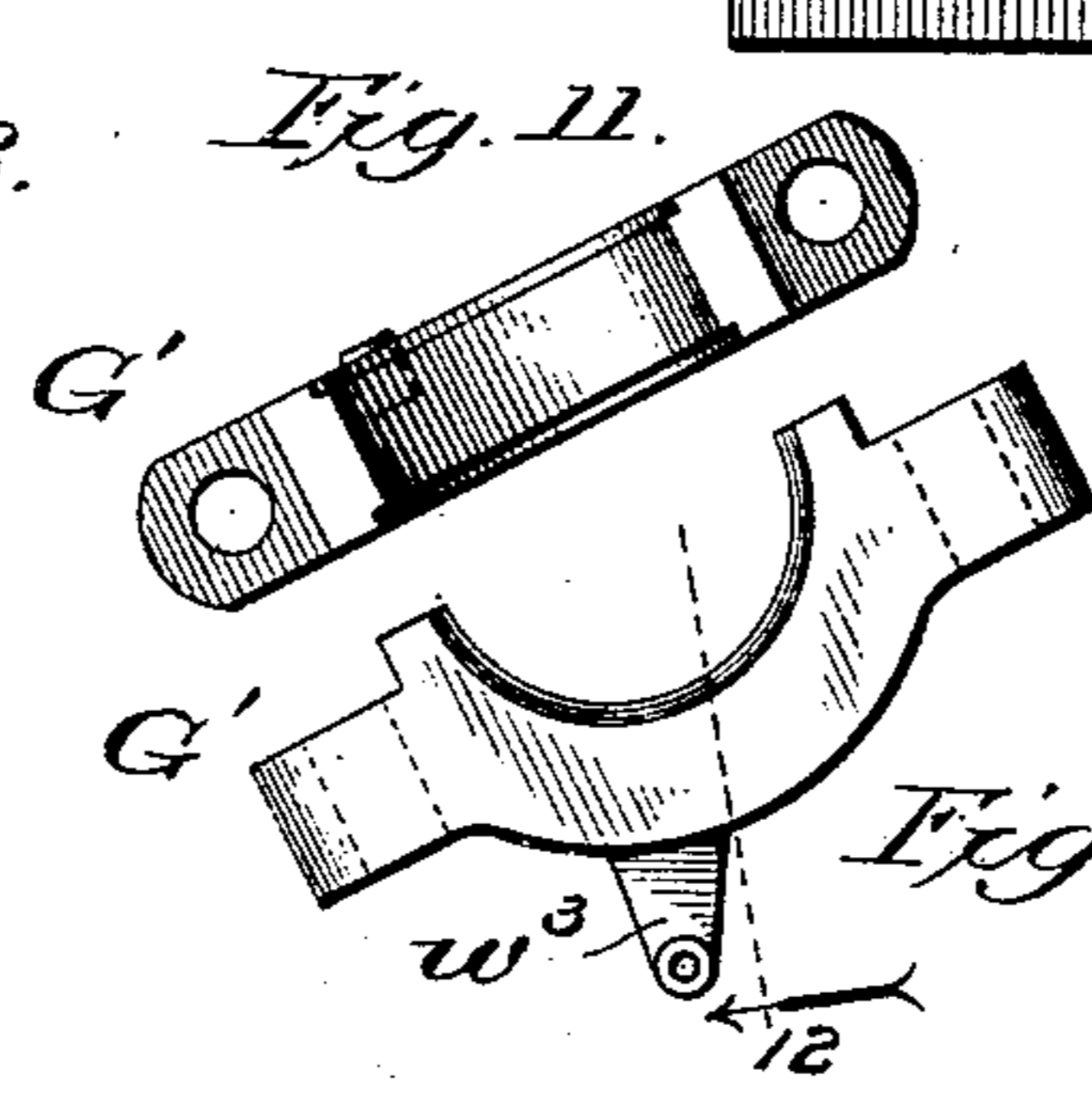
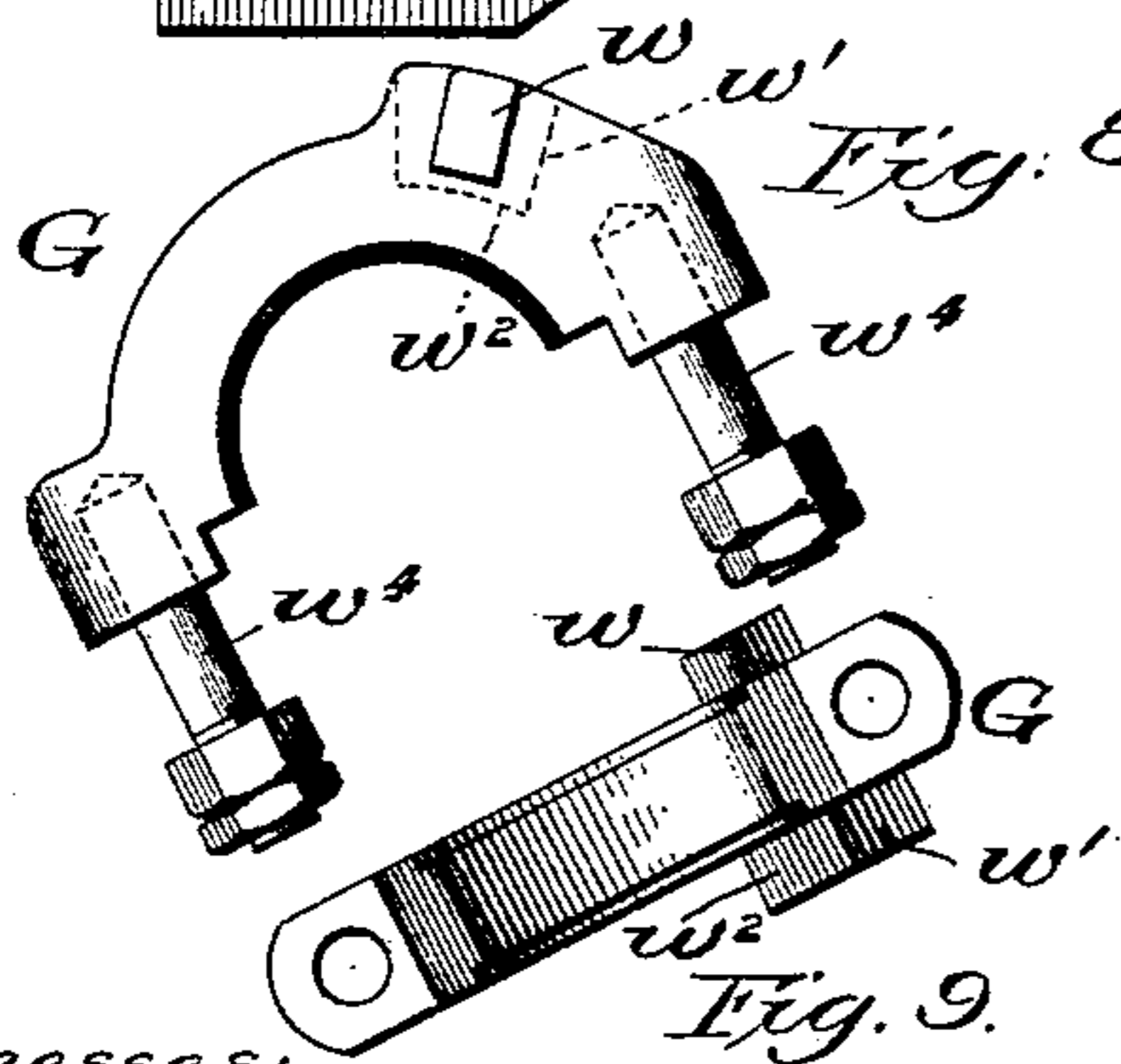
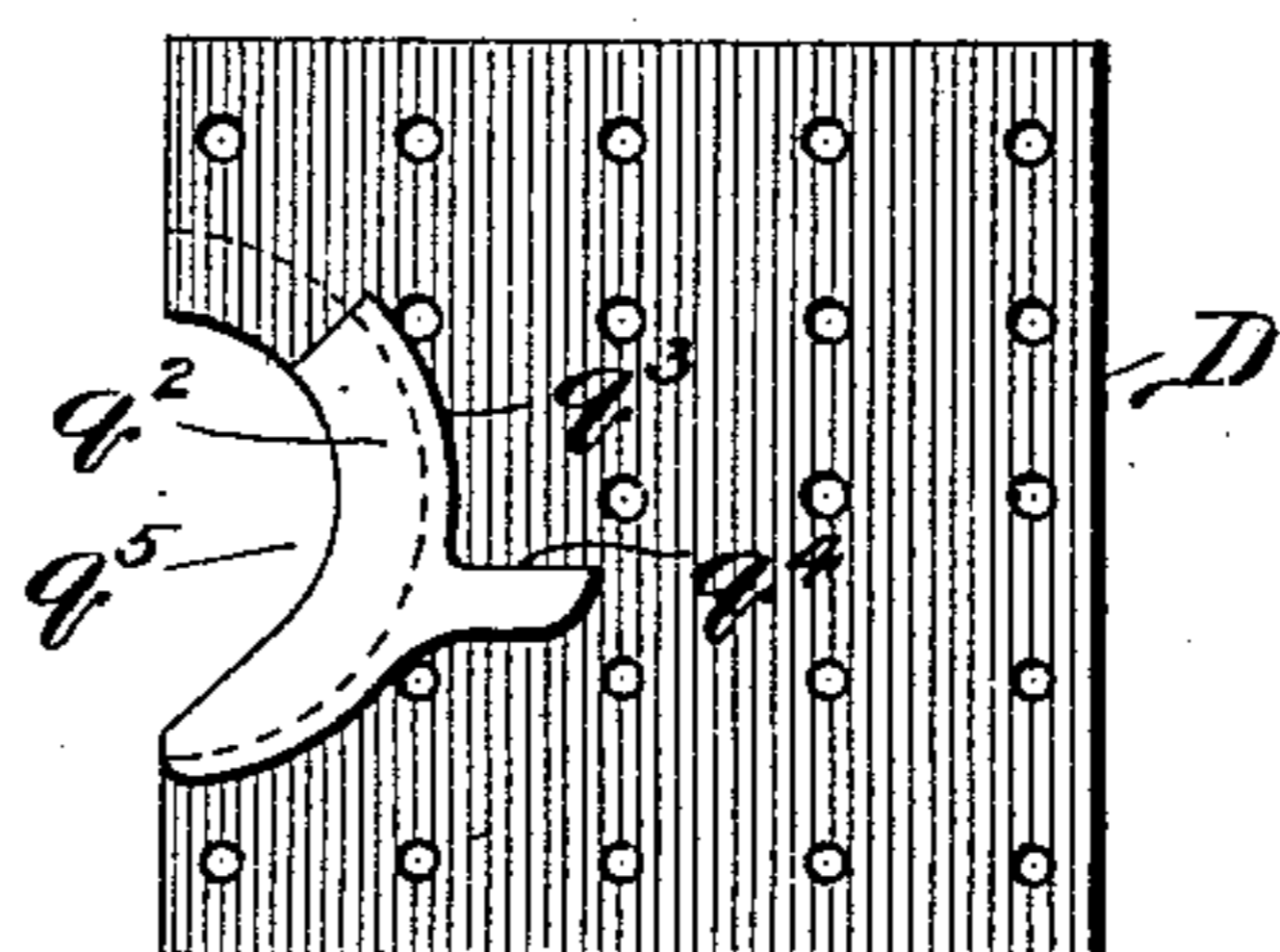
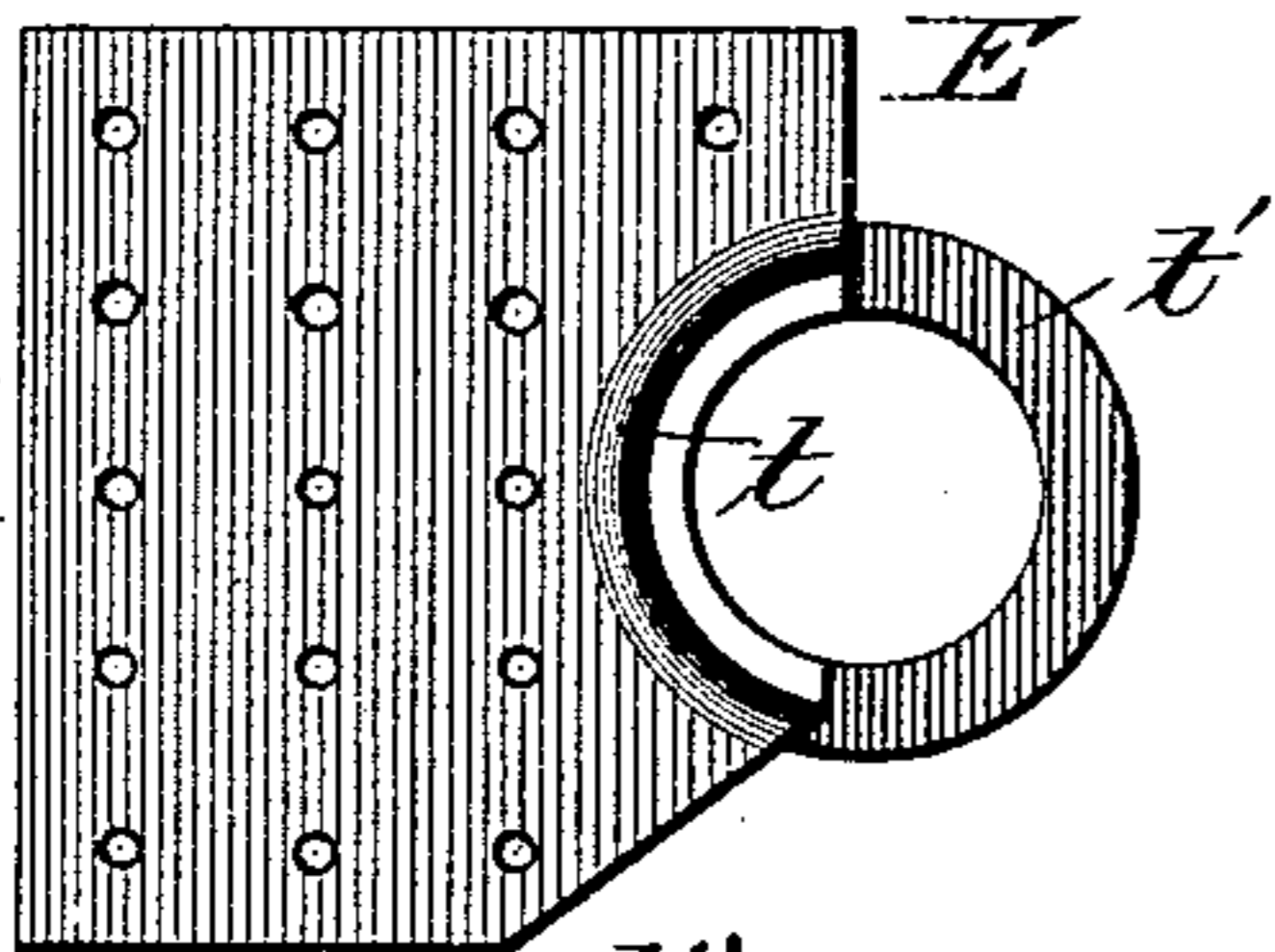


Fig. 7.



Witnesses:
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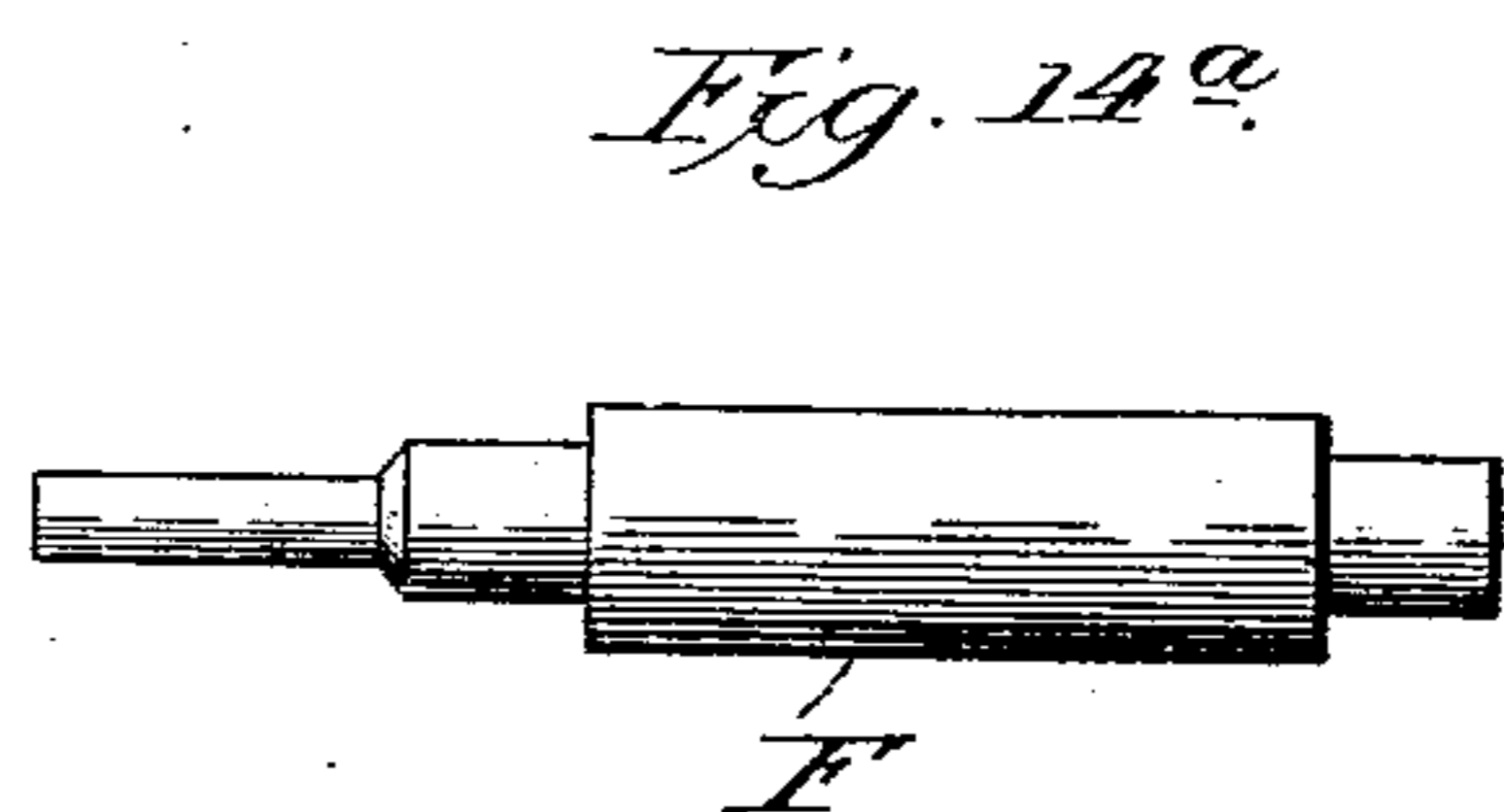
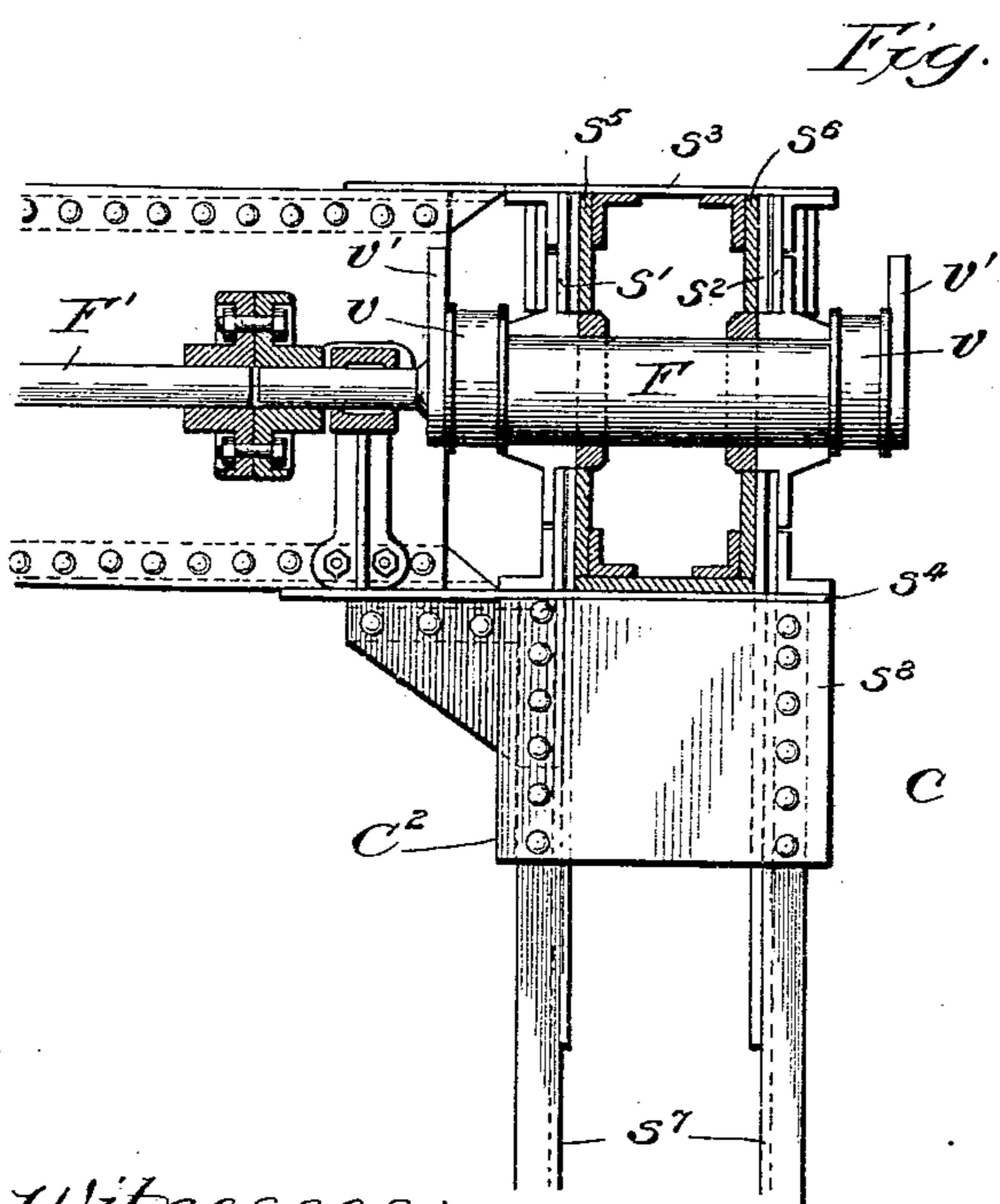
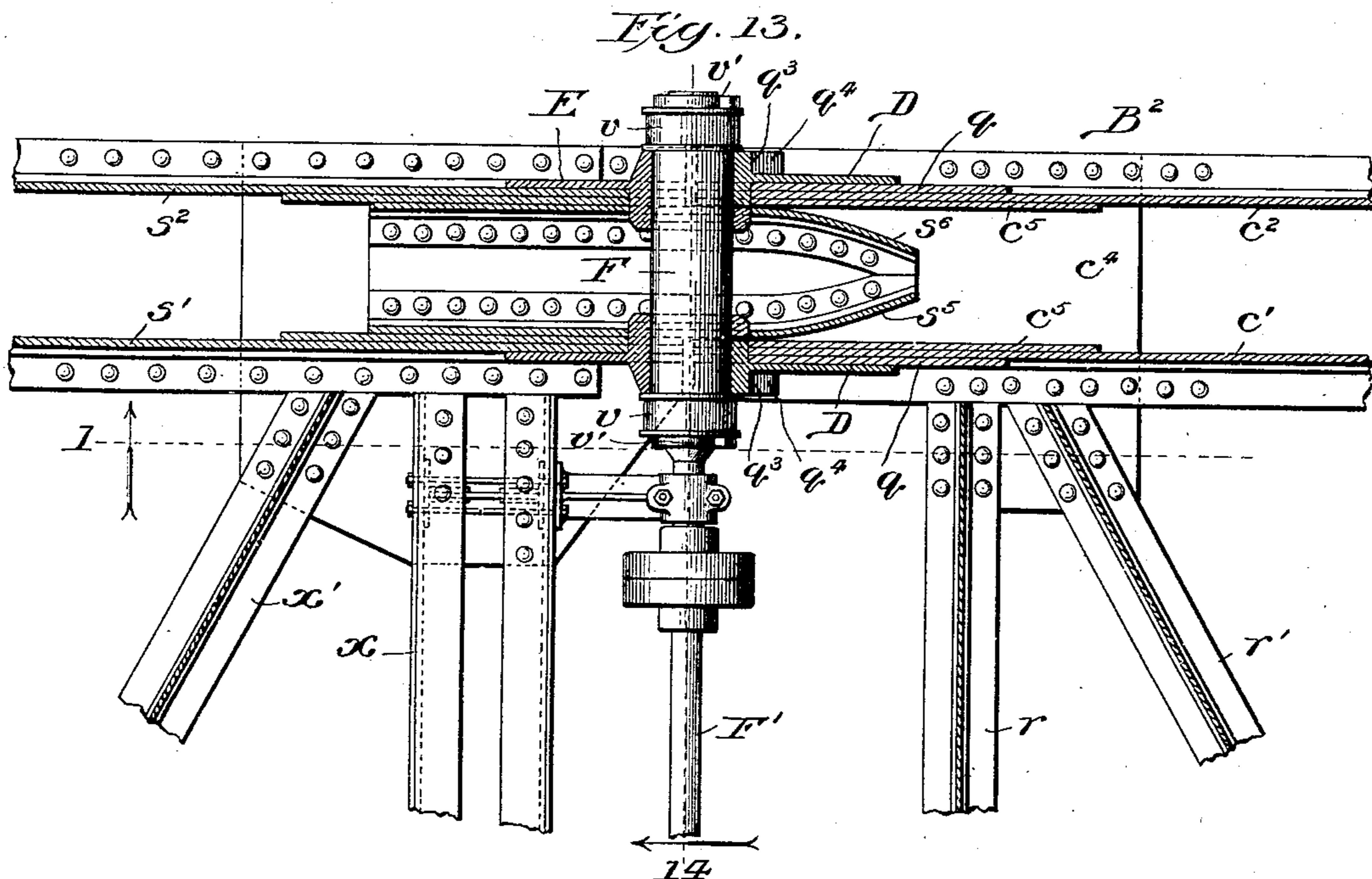
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C. L. KELLER.
BRIDGE.

(Application filed Mar. 25, 1901.)

(No Model.)

5 Sheets—Sheet 3.



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(Application filed Mar. 25, 1901.)

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5 Sheets—Sheet 4.

Fig. 15.

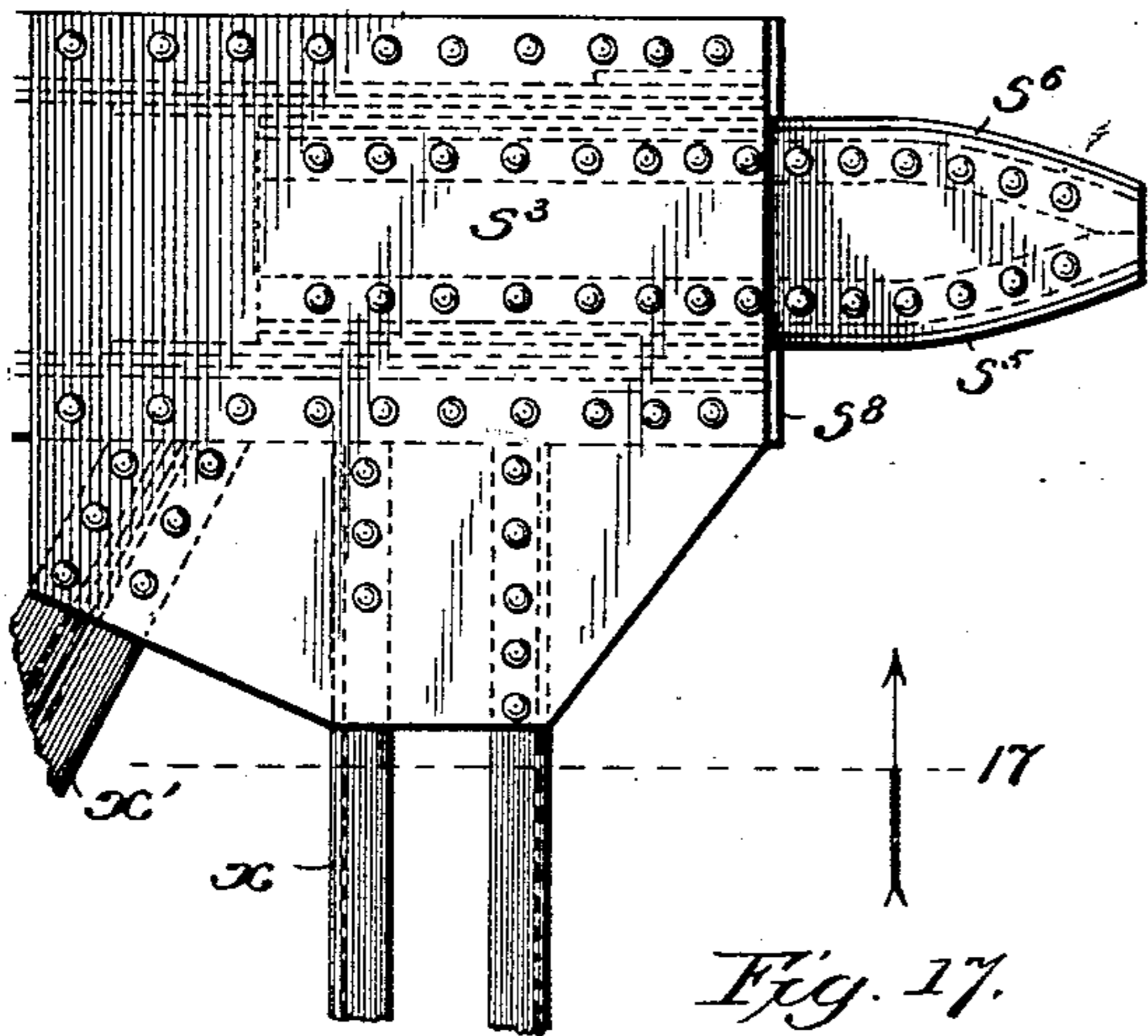


Fig. 16.

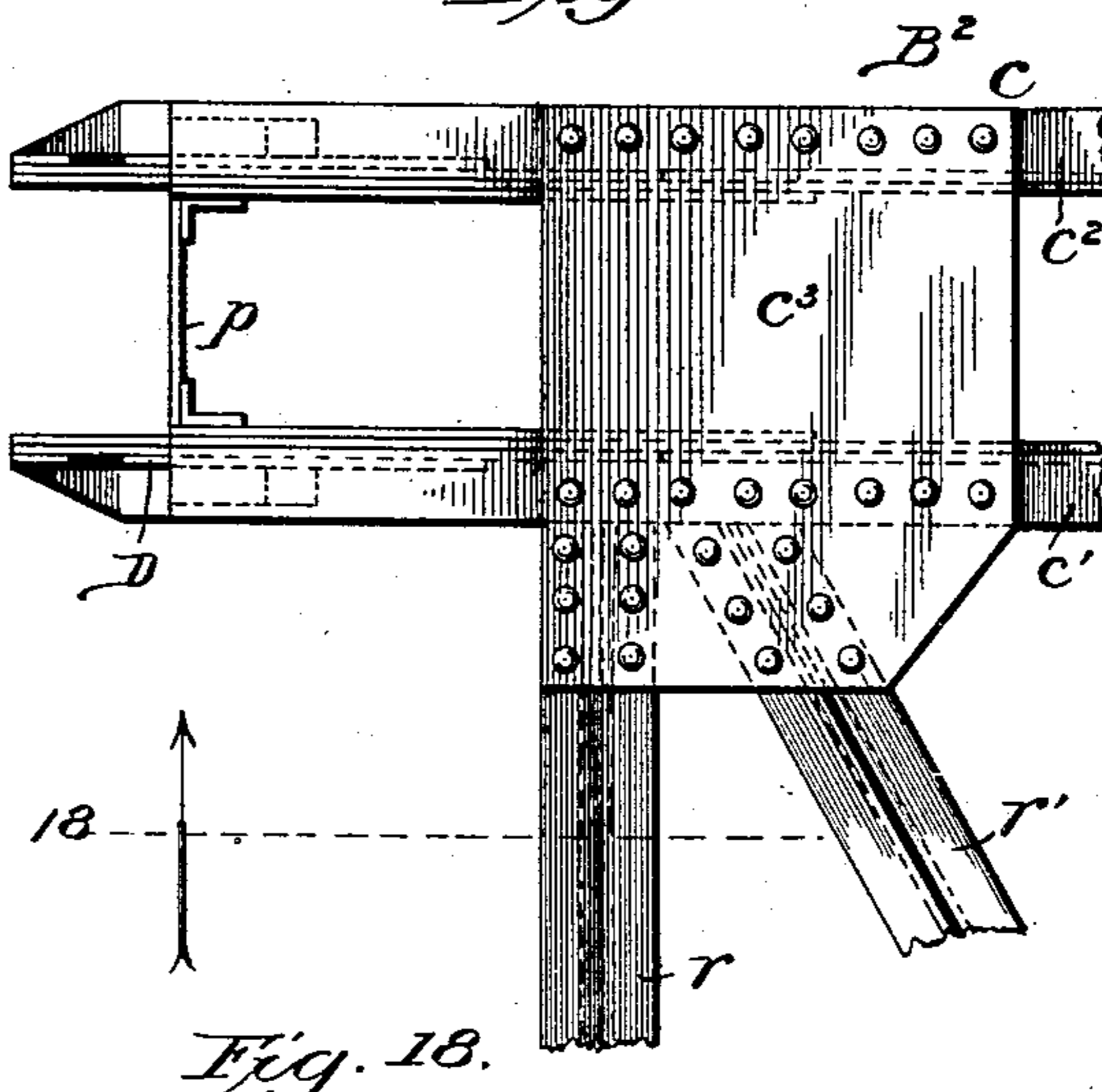


Fig. 17.

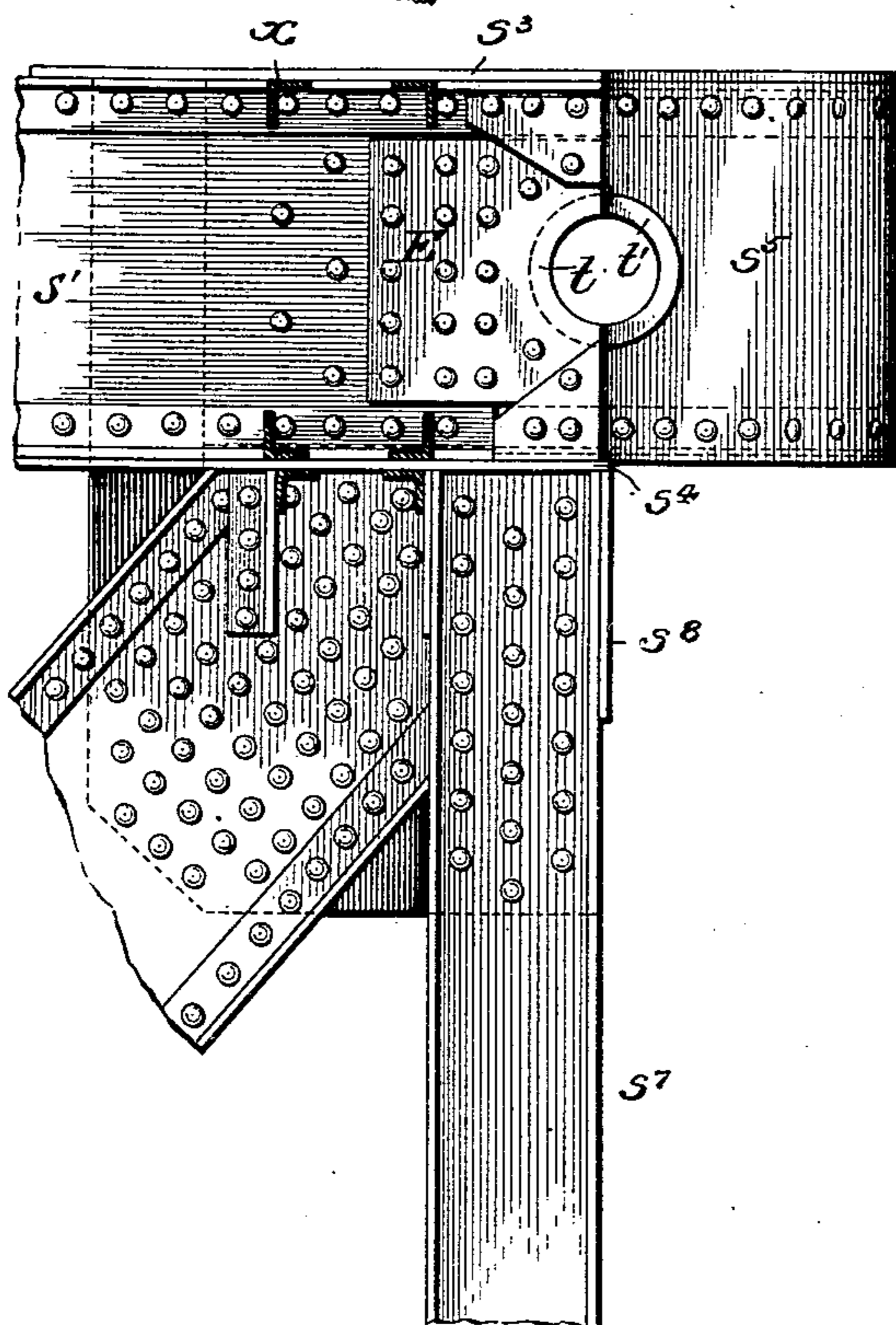
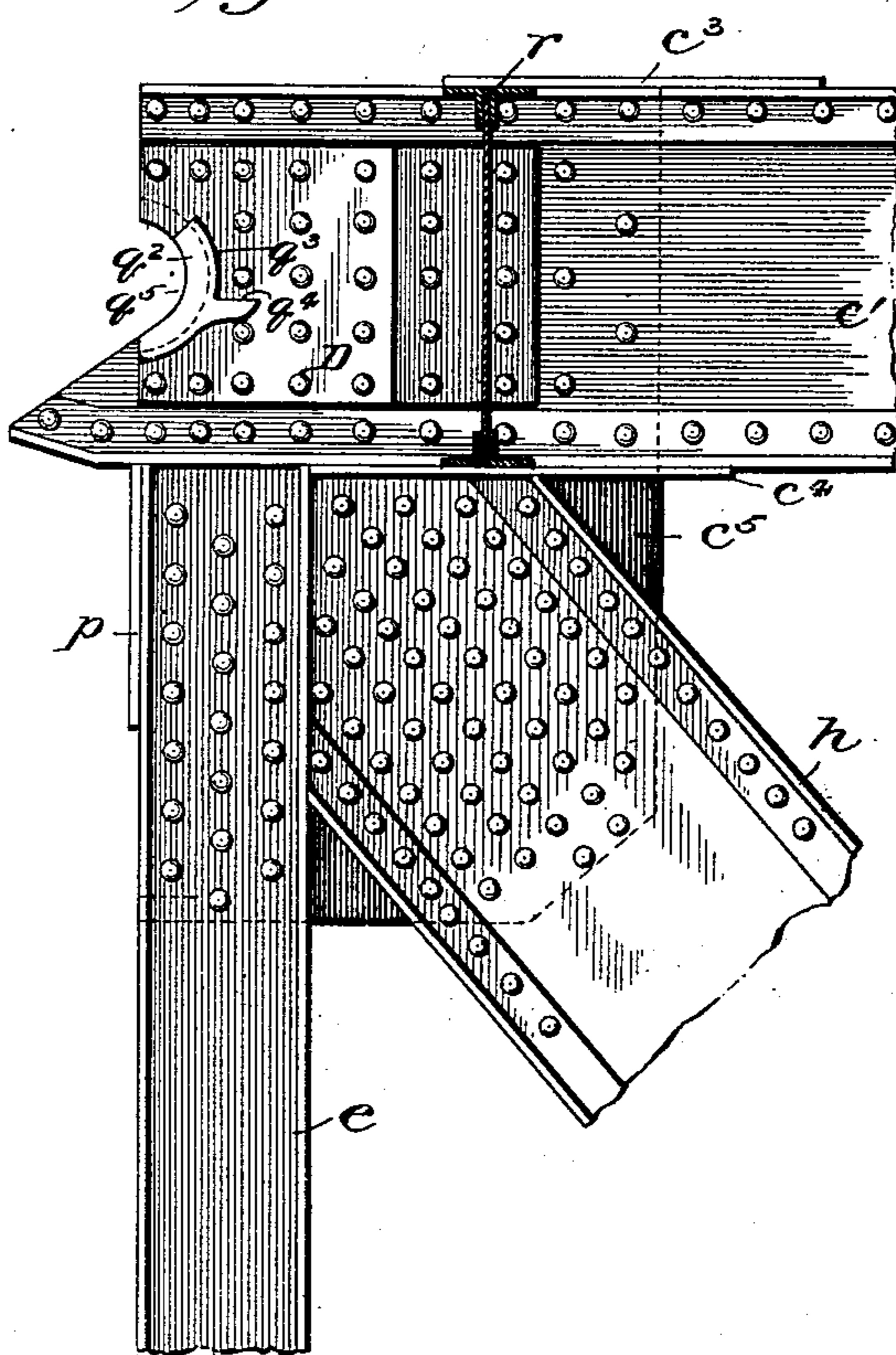


Fig. 18.



Witnesses:

Dear Gaylord!
John Enders Jr.

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C. L. KELLER.
BRIDGE.

(Application filed Mar. 25, 1901.)

(No Model.)

5 Sheets—Sheet 5.

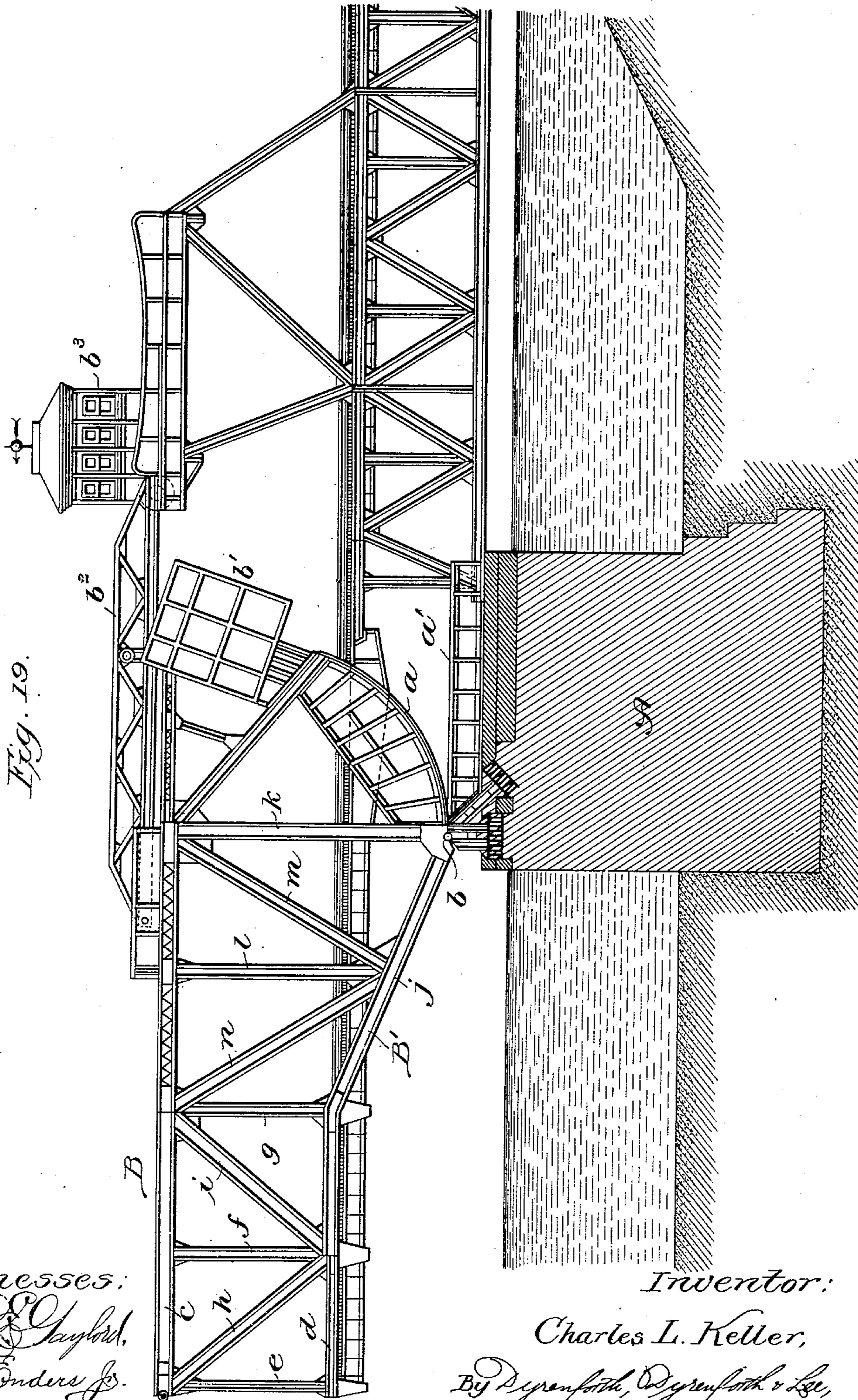


Fig. 19.

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UNITED STATES PATENT OFFICE.

CHARLES L. KELLER, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE SCHERZER ROLLING LIFT BRIDGE COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

BRIDGE.

SPECIFICATION forming part of Letters Patent No. 685,768, dated November 5, 1901.

Application filed March 25, 1901. Serial No. 52,814. (No model.)

To all whom it may concern:

Be it known that I, CHARLES L. KELLER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented new and useful Improvements in Bridges, of which the following is a specification.

My invention relates particularly to vertically-swinging bridges of the arch type, though not limited thereto.

My object is to provide improved bearings and locking means for joining the meeting ends of two swinging bridge sections or leaves. In the preferred construction the side frames of one section or leaf are equipped with tongues or projections which enter suitable sockets of the corresponding side frames of the other section or leaf, and the second section is provided at each side frame with relatively short extensions which engage suitable bearings flanking the base of the tongue of the corresponding side frame of the first section. Improved means are provided for preventing separation or opening of the bridge-sections except at the will of the operator.

In the accompanying drawings, Figure 1 represents a broken vertical section of the meeting ends of the sections of a bridge embodying my improvements, the section being taken as indicated at line 1 of Fig. 13, the locking device employed being shown in position to permit separation or opening of the bridge-sections; Fig. 2, a similar sectional view, but showing an intermediate position of the locking device; Fig. 3, a similar sectional view, but showing the bridge locked against opening; Figs. 4 and 5, top and side views, respectively, of the shaft-bearing employed; Figs. 6 and 7, top and side views, respectively, of the locking member employed; Figs. 8 and 9, side and bottom views, respectively, of an eccentric-strap member employed; Figs. 10 and 11, side and top views, respectively, of a companion eccentric-strap member; Fig. 12, a sectional view taken as indicated at line 12 of Fig. 10; Fig. 13, a plan section taken as indicated at line 13 of Fig. 1; Fig. 14, a transverse vertical section taken as indicated at line 14 of Fig. 13; Fig. 14^a, a detail of a shaft employed; Fig. 15, a broken

plan view of a side frame of one of the bridge-sections; Fig. 16, a broken plan view of the companion side frame of the other bridge-section; Fig. 17, a sectional view taken as indicated at line 17 of Fig. 15; Fig. 18, a sectional view taken as indicated at line 18 of Fig. 16, and Fig. 19 a view in side elevation of one of the bridge-sections and its pier.

Referring to Fig. 19, A represents a pier, upon which is mounted a bridge-section B, having a curved or segmental part or member *a*, adapted to roll on a base *a'* in the operation of opening the bridge. The section B has side frames, trusses, or arches *B'* *B*² supplied with trunnions *b*, which when the bridge-section is in its closed position rest in suitable concavities with which the bearing is provided. The bridge-section is provided with a counterweight *b'* and is operated in a well-known manner by struts or bars *b*², controlled from a tower *b*³.

The two side frames, trusses, or arches of the bridge-section B are of a like construction, as are also the two side frames of a companion bridge-section C, only the side frame *C*² whereof is shown in the drawings. The general construction of all of the side frames is similar. In Fig. 19 the side frame *B'* is shown as comprising horizontal beams or chords *c d*, connected by uprights *e*, *f*, and *g* and inclined braces *h i*, and an inclined chord or member *j*, connected with the top member *c* by uprights *k l* and inclined braces *m n*. The side frame *B*² is provided with like members. The member *c* comprises built-up channel-bars *c'* *c*², connected by a top tie-plate *c*³ and a bottom tie-plate *c*⁴ and having secured thereto connecting-plates *c*⁵ for connection with the built-up channel-beams forming the member *h* and the upright channel-beams forming the member *e*. It is to be understood that there is a channel-bar for the member *h* corresponding to each channel-bar *c'* *c*² of the beam *c*. The same may be said of the upright *e*. The two channel-bars of the upright *e* are connected by a tie-plate *p*, the upper edge of which is flush with the bases of the channel-bars *c'* *c*² and serves as a bearing for the tongue of the companion side frame.

D D represent locking members secured to the webs of channel-bars *c'* *c*² and interposed

plates q , as clearly shown in Fig. 13. These locking members are provided, Figs. 6 and 7, with lugs q' q^2 , the latter having a curved surface q^3 for engaging a companion locking member, and a flat surface q^4 , which operates as a stop in a manner to be described presently. The free end of the member D is provided with a curved recess q^5 , and the ends of the webs of the channel-bars c' c^2 are provided with curved recesses for receiving the lugs q' .

As thus described, the side frame B^2 is provided at the chord or beam c with a central socket for receiving a tongue on the corresponding side frame of the other bridge-section and with fixed locking members for engagement with movable locking members connected with the other bridge-section and to be described presently.

Any suitable cross-beams may be provided for connecting the bases of the side frames A' B^2 and for connecting the tops thereof. It will be understood that in this type of bridge the road-bed is most commonly suspended between the bases of the side frames. I have shown the top beams c of the side frames B' B^2 connected by a built-up I-beam r and a diagonally-extending I-beam r' .

The side frame C^2 has members corresponding to the members enumerated in the description of the side frame B^2 . The top member or beam is designated s and comprises built-up channel-bars s' s^2 , having their flanges turned away from each other, and top and bottom plates s^3 s^4 , respectively. Between the channel members s' s^2 are short built-up channel members s^5 s^6 , having their flanges turned toward each other, said channel members projecting beyond the end proper of the side frame and having curved extremities, as indicated in Fig. 13, for guiding the tongue properly to its socket. End channel-member uprights s^7 , corresponding to the uprights e of the bridge-section, are provided for the side frame C^2 . These uprights are connected by a plate s^8 , the ends whereof project beneath and support the oppositely-turned lower flanges of the channel-beams s' s^2 , which lower flanges serve as bearings flanking the base of the tongue formed by the channel members s^5 s^6 . These last-named bearings serve to receive the short projections of the channel-beams c' c^2 of the companion side frame, which latter projections extend beyond the plate p , as shown in Figs. 16 and 18. To the outer surfaces of the webs of the channel-beams s' s^2 are secured journal plates or members E . (Shown in detail in Figs. 4 and 5.) Each plate E has an outturned concavo-convex lug t and an intumed perforated lug t' , the latter fitting into suitable concavities in the ends of the webs of the channel-beams, to which they are attached, and into the perforations with which the channel members s^5 s^6 are provided. The bearings thus described receive a shaft-section F , Figs. 14 and 14^a, on which are eccentrics v and at the ex-

tremities of which are carried arms v' . The shaft-section F has motion imparted to it through the medium of a shaft-section F' , which is operated by any suitable motor. Each eccentric v receives a two-part eccentric-strap G G' , details of which are shown in Figs. 8 to 12, inclusive. Each part G is provided with a lateral lug w , which is engaged by an arm v' on the shaft F , and on its opposite face with a lateral lug w' , having a curved surface w^2 , which serves to engage the curved surface q^3 of a plate or member D when the bridge-sections are locked together. The part G' is provided with a lug or arm w^3 , with which connects a spring w^4 , Fig. 1, that serves to hold the eccentric-strap with the lug w firmly engaging the adjacent arm v' of the shaft-section F . The eccentric-strap sections are connected by bolts w^4 and have suitable grooves or engaging corresponding flanges on the eccentric.

I have shown members x x' for connecting the top beam of the side frame C^2 to the corresponding beam of the side frame C' . (Not shown.) The construction of the side frame C^2 , just described, is duplicated at the other side frame (not shown) of the bridge-section C .

In operation the bridge-sections are lowered, with the section B somewhat in advance of the section C , whereby the relatively long tongues of the section C may be readily caused to enter the sockets provided for them on the section B and bear upon the plates or bearings p . Thereafter the bridge-sections are simultaneously lowered, and the relatively short projections on the bridge-section B pass over and rest upon the bearings provided therefor, flanking the bases of the tongues of the bridge-section C , the bridge-sections thereafter being in perfect alinement across streams. After the bridge-sections have been brought to the position shown in Fig. 1 by the movement just described the shaft-sections F are caused to rotate by means of a suitable motor or motors in the direction indicated by the arrow in Fig. 1. As the shaft-sections F rotate the eccentric-straps are drawn around by their springs, the lugs w being thereby maintained in contact with the arms v' until the lugs w' engage the surfaces q^4 of the stationary locking members D , whereupon the eccentric-straps cease to rotate. The shaft-sections continue to rotate and the eccentrics thereon retract the eccentric-straps or draw them toward the bridge-section C , thereby causing the lugs w' to slide upon the surfaces q^4 until the concave surfaces w^2 engage the convex surfaces q^3 , thereby firmly locking the bridge-sections together. The locking operation serves to draw the bridge-sections into a completely-closed position and into exact alinement in a horizontal plane, the bearings being pressed firmly together. In the closed position the bridge-sections have pin-bearings at the piers and a pin or line bearing at their meeting ends, thus forming an arch with a

three-point bearing. The locking mechanism employed serves to prevent the weight of a train or of passing vehicles while upon the short arm of a bridge-section from partially opening the bridge.

While I have shown the improved means for connecting the adjacent ends of the swinging bridge-sections in connection with a bridge the sections whereof are mounted in a novel manner upon their piers, it is to be understood that the invention is not limited to the construction shown. Various changes in construction within the spirit of my invention may be made. Hence no limitation is intended by the foregoing detailed description except as shall appear from the appended claims.

It may be stated that in bridges now in common use known as "rolling-lift" bridges it is usual to provide the bases a' and the segment a with means for preventing slipping of the bridge-sections, such as cogs and racks. For the purpose of this application the sections of rolling-lift bridges are to be regarded as swinging sections.

The invention is applicable to bridges having sections which part at their adjacent ends in opening and where each bridge-section contributes support to its companion bridge-section.

What I claim as new, and desire to secure by Letters Patent, is—

1. In a bridge having swinging sections, means for securing the bridge-sections in their closed position, comprising a fixed locking member carried by one bridge-section, and a locking member carried by the other bridge-section having a movement of rotation and of translation, whereby its locking portion may be moved over to the farther side of the locking portion of the companion locking member, and then moved into engagement, substantially as and for the purpose set forth.

2. In a bridge having swinging sections, means for locking the meeting ends of the sections together, comprising a locking member carried by one section and a partially-rotatable eccentric-actuated locking member carried by the other bridge-section, substantially as and for the purpose set forth.

3. In a bridge having swinging sections, means for locking the meeting ends of said sections together comprising fixed locking members carried by the side frames of one section, a shaft carried by the other section and provided with eccentrics, and locking members carried by said eccentrics and capable of partial rotation to bring their locking portions opposite the locking portions of said fixed locking members, after which said eccentrics serve to give a movement of translation to the movable locking members, substantially as and for the purpose set forth.

4. In a bridge of the arch type having vertically-swinging sections, relatively long tongues carried by one of said sections, sockets on the other of said sections adapted to

receive said tongues, relatively short projections on the last-named section, bearings therefor on the companion section, a fixed locking member carried by one of the sections and a movable locking member carried by the other section, substantially as and for the purpose set forth.

5. In a bridge having swinging sections, relatively long tongues carried by the side frames of one of said sections, sockets therefor carried by the other of said sections and flanked by relatively short projections, bearings for said projections on the companion bridge-section, a stationary locking member carried by one section and a locking member carried by the other section having a movement of partial rotation and then of translation to bring it into engagement with the fixed locking member, substantially as and for the purpose set forth.

6. In a bridge having vertically-swinging sections, side frames having beams from which the road-bed is suspended, sockets in said beams of one section flanked by relatively short projections, tongues carried by said beams of the other section and having their bases flanked by bearings for said projections, fixed locking members connected with the beams of one section, and locking members connected with the beams of the other section and having a movement of partial rotation and then of translation to bring them into engagement with said fixed locking members, substantially as and for the purpose set forth.

7. In a bridge having vertically-swinging sections, side frames having beams from which the road-bed is suspended, shaft-sections carried by the beams of one bridge-section, concavities in the ends of the beams of the companion bridge-section, fixed locking members secured to said last-named beams and provided with lugs having convex surfaces, eccentrics carried by said shaft-sections, and eccentric-straps on said eccentrics having a partial movement of rotation and provided with concavities for engaging the convex surfaces of said lugs, substantially as and for the purpose set forth.

8. In a bridge having vertically-swinging sections, beams from which the road-bed is suspended, rotatable shafts carried by the beams of one section, eccentrics on said shafts, spring-held eccentric-straps on said eccentrics, arms carried by said shafts and serving to hold said straps in an unlocked position, locking-lugs carried by said straps, concavities in the ends of the beams of the other bridge-section for receiving said shafts and locking members carried by said last-named beams and provided with fixed locking-surfaces and with lugs for engagement with said eccentric-straps after the latter have been permitted to rotate partially by a rotation of the shafts, substantially as and for the purpose set forth.

9. In a bridge having vertically-swinging

sections, the combination with the side frames thereof of tongues carried by the side frames of one section, shafts extending through said tongues, movable locking members carried by said shafts, sockets carried by the side frames of the other bridge-section for receiving said tongues, and fixed locking members carried by said last-named side frames for engagement by said movable locking members, substantially as and for the purpose set forth.

10. In a bridge having vertically-swinging sections, the combination of side frames having built-up top beams, tongues secured between the members of the built-up beams of one section and projecting from the end of the section, shafts extending through said tongues, eccentrics carried by each shaft and flanking the journal-boxes thereof, eccentric-straps mounted on said eccentrics, springs tending to cause a rotation of said eccentric-straps, arms carried by each shaft and serving normally to prevent rotation of said eccentric-straps, locking members carried by said eccentric-straps, sockets or concave walls at the ends of the beams of the other section for receiving said shafts, locking members secured to the lateral surfaces of each beam of said last-named section and provided with shoulders for engagement with the locking members carried by said eccentric-straps and lugs carried by the fixed locking members and serving to engage said eccentric-straps after a partial rotation thereof and prevent further rotation while the movable locking members are being drawn into locking engagement with the fixed locking members by said eccentrics, substantially as and for the purpose set forth.

11. In a bridge having vertically-swinging sections, the combination of side frames for one section provided with top members comprising beams s' , s^2 , tongues built up from structural metal and secured between said beams and projecting from the ends of the bridge-sections, shafts extending through said tongues and provided at opposite sides thereof with eccentrics, straps on said eccentrics provided with locking-lugs, bearings flanking the bases of said tongues, top members for the other bridge-section comprising beams c' , c^2 , a socket between each set of beams for receiving a tongue, suitable concavities being provided at the ends of said beams for receiving a shaft, locking members secured to said last-named beams and provided with lugs for engagement with the lugs on said eccentric-straps, and means for regulating the movement of the eccentric-straps with relation to

the eccentric, substantially as and for the purpose set forth.

12. In a bridge having vertically-swinging sections, the combination of journal-box plates E secured to the side frames of one section, shafts journaled in said plates, locking members eccentrically mounted on said shafts and locking members D secured to the side frames of the other section and provided with lugs q^4 and convex surfaces q^3 for engagement with the locking members carried by said shafts, substantially as and for the purpose set forth.

13. In a bridge having vertically-swinging sections, the combination with the side frames of one section of a transverse rotatable shaft provided with an eccentric, a locking member mounted on said eccentric, a spring tending to cause rotation of said locking member, an arm carried by the shaft and serving normally to hold said locking member against rotation, a locking member carried by the other bridge-section and provided with means for engaging said eccentrically-mounted locking member after a partial rotation of the latter, and a locking-shoulder carried by said fixed locking member, whereby, when the shaft is rotated the eccentrically-mounted locking member is rotated by its spring till engaged by said fixed locking member, after which further rotation of the shaft causes the eccentric to move its locking member bodily to bring its locking-surface into engagement with the locking-surface of the fixed member, substantially as and for the purpose set forth.

14. In a vertically-swinging bridge, the combination of beams s' , s^2 , tongues comprising members s^5 , s^6 secured between said beams journal-plates E fixed to said beams and said tongues, shafts F extending through the said tongues, eccentrics carried by said shafts, locking members carried by said eccentrics, beams c' , c^2 for the other bridge-section, bearings between said beams for receiving said tongues, projections on said beams flanking the sockets for said tongues, bearings on the other bridge-section flanking said tongues and receiving said projections, and locking members D secured to the beams c' , c^2 and having concave ends for receiving the shafts F, and provided with means for engaging said eccentrically-mounted locking members, substantially as and for the purpose set forth.

CHARLES L. KELLER.

In presence of—

D. W. LEE,
ALBERT D. BACCI.