No. 685,767. Patented Nov. 5, 1901.

C. L. KELLER.

BRIDGE.

(Application filed Jan. 28, 1901.)

(No Model.) 3 Sheets—Sheet 1.

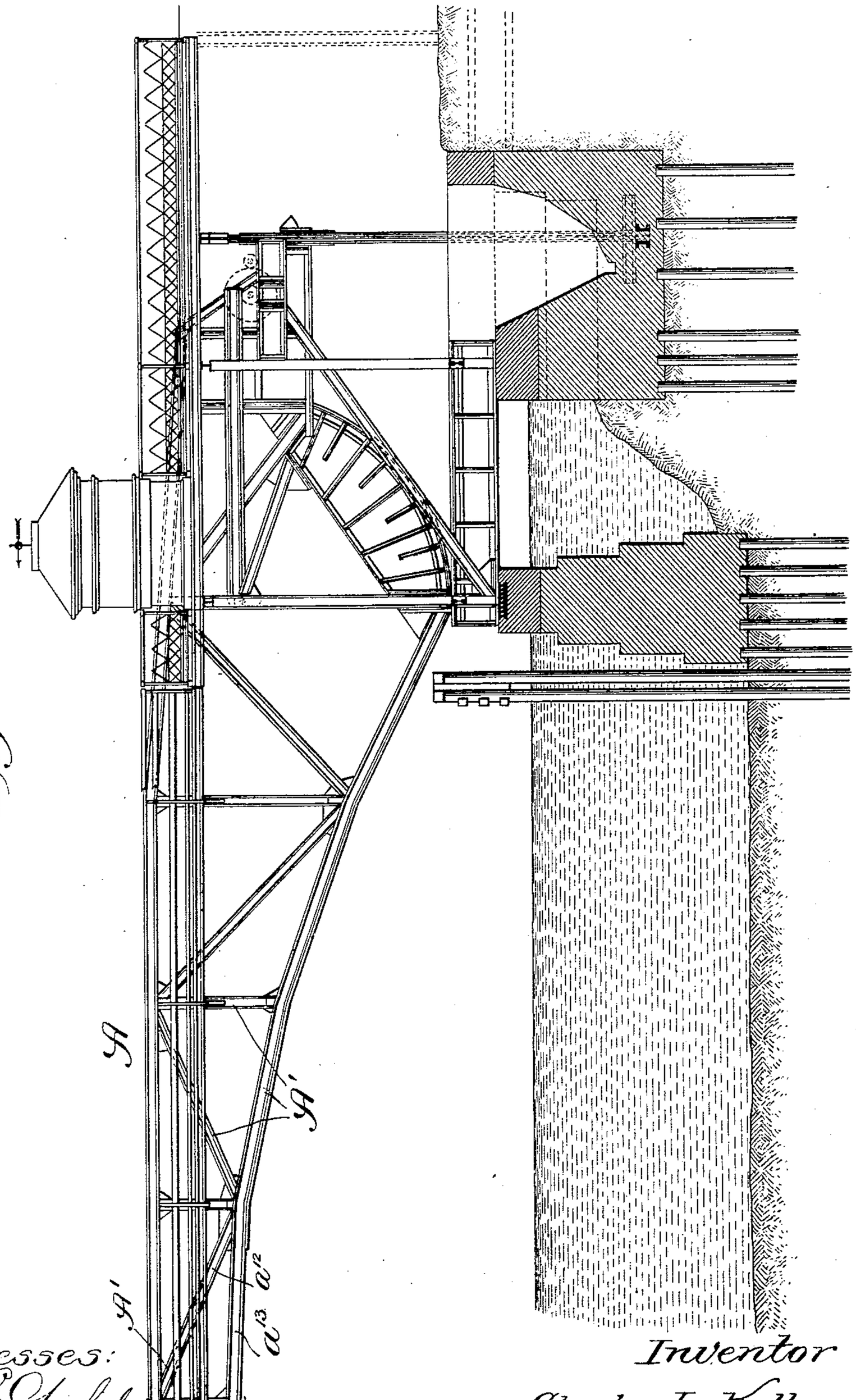

Fig. 1.

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Inventor
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(No Model.) 3 Sheets—Sheet 2.

Fig. 2.

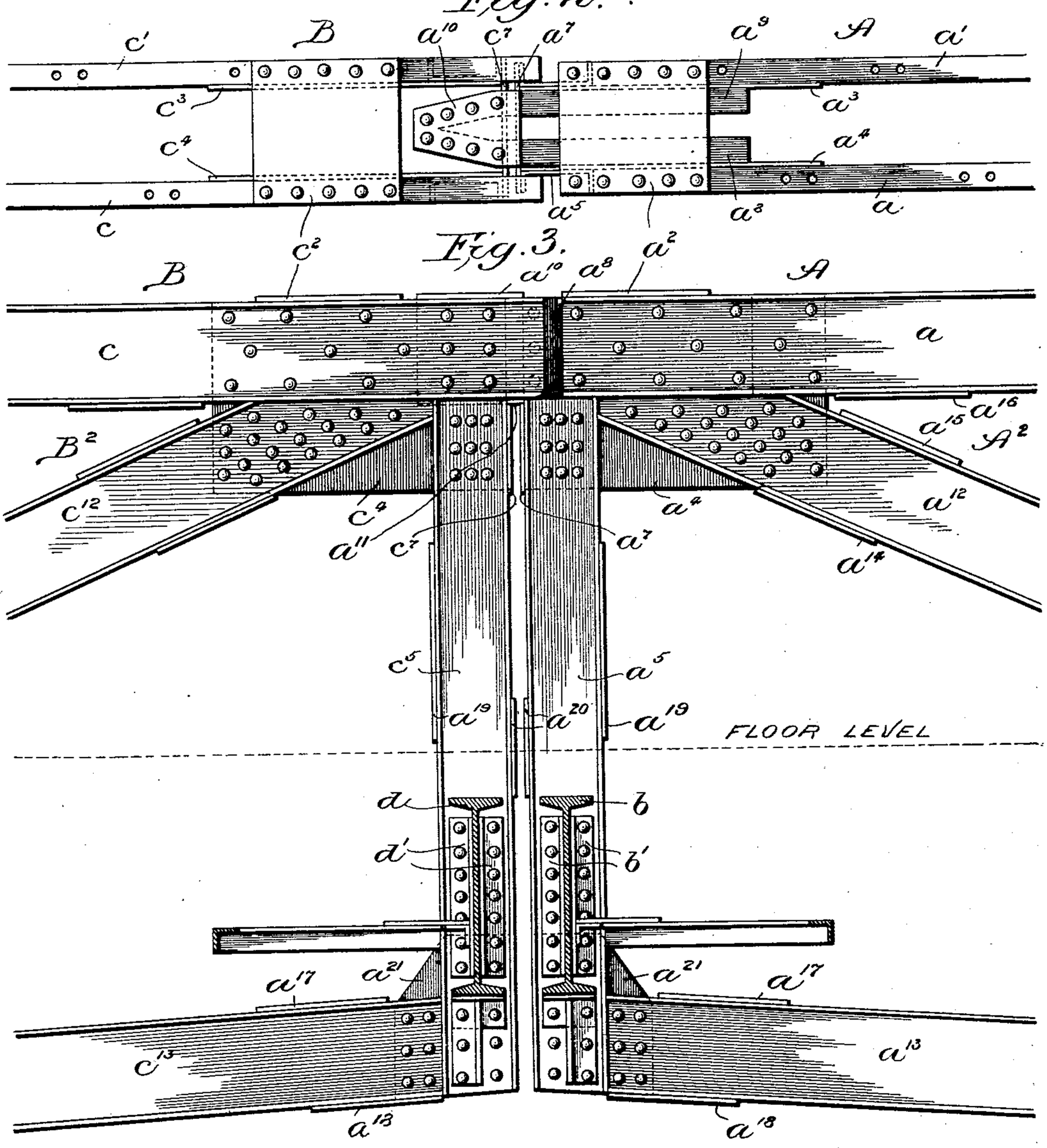

Fig. 3.

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(No Model.) 3 Sheets—Sheet 3.

Fig. 4.

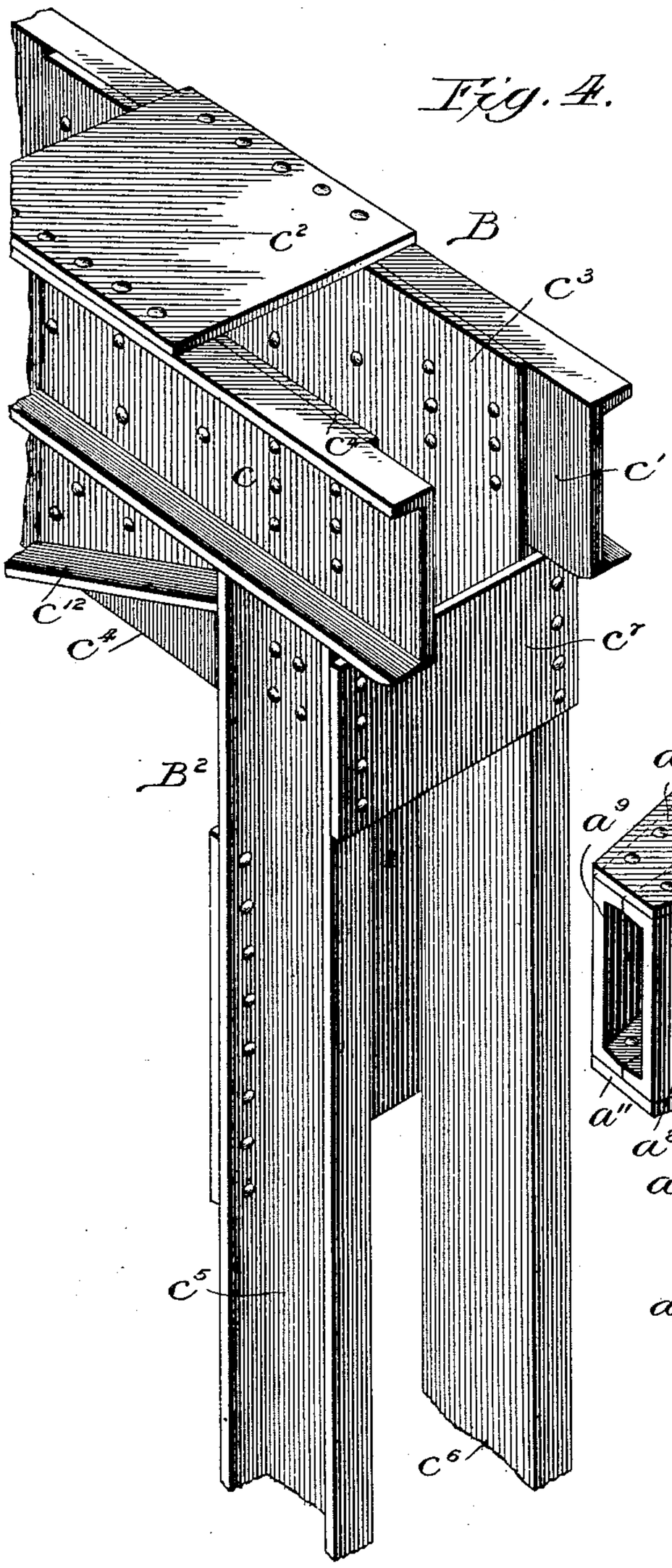
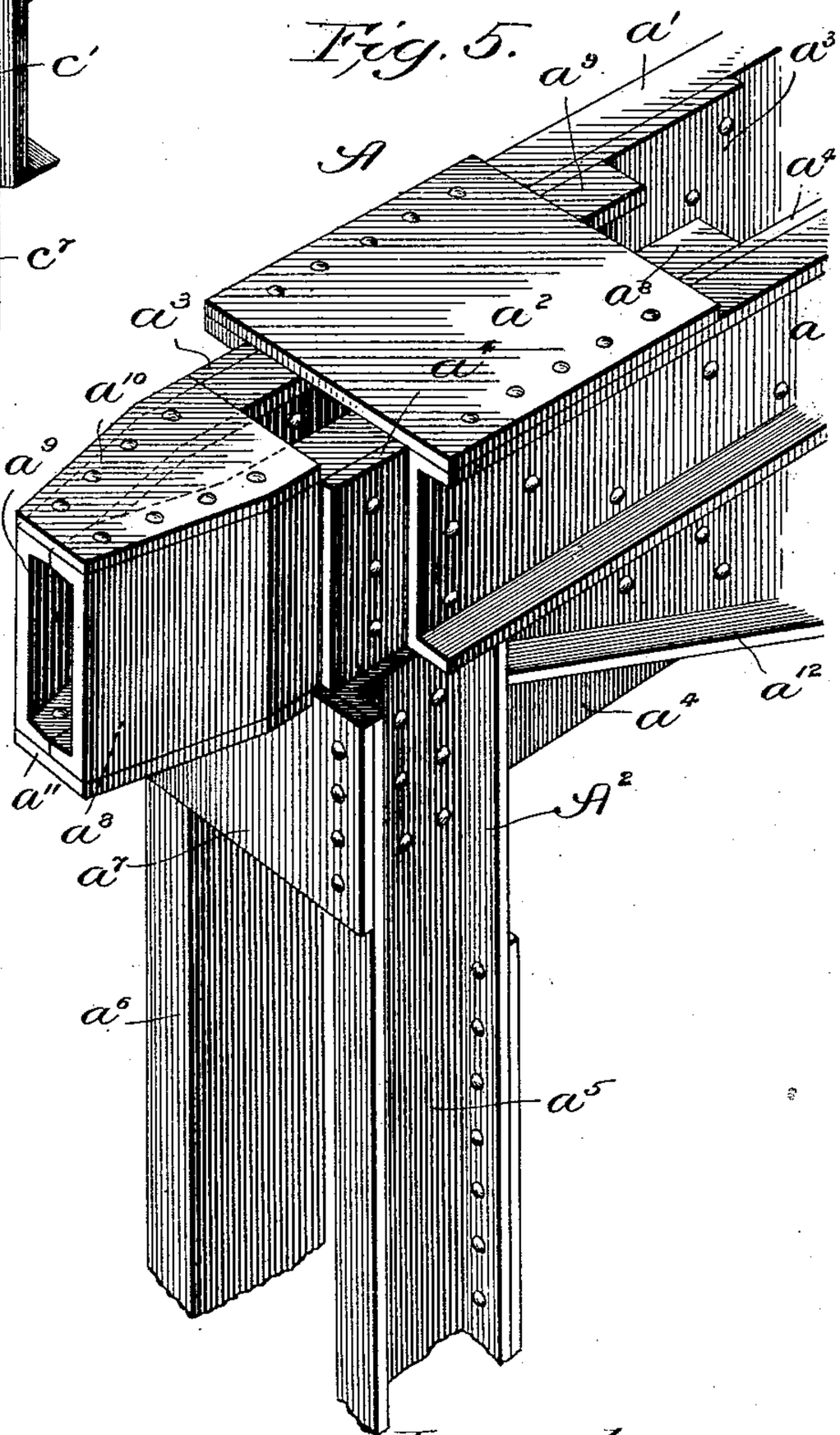


Fig. 5.



Witnesses:
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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. 685,767, dated November 5, 1901.

Application filed January 28, 1901. Serial No. 45,085. (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 more particularly to bridges employing vertically-moving leaves whose free ends join above the stream, waterway, or ravine when the bridge is closed, although the invention is not limited to bridges whose leaves have a vertical movement.

My primary object is to provide improved means whereby the meeting ends of the bridge sections or leaves may be automatically connected together, so that the stress may be transmitted from either section to the other and so that the sections are held firmly against lateral movement with relation to each other.

My invention is of particular value when used in connection with a bridge of the type described in Letters Patent No. 511,713, granted to William Scherzer on December 26, 1893. The invention may be employed, however, in any bridge wherein are employed two moving leaves which have no support at their free ends other than that contributed by each to the other.

In the accompanying drawings, which illustrate my improvements in connection with a bridge of the type shown in said patent, Figure 1 is a view in side elevation showing one bridge section or leaf and the manner in which it is supported at the pier; Fig. 2, a broken plan view showing the manner in which adjacent side trusses of the two bridge-leaves meet; Fig. 3, a broken longitudinal vertical section showing the meeting ends of adjacent side trusses; Fig. 4, a broken perspective view of a side truss of one bridge-leaf, and Fig. 5 a broken perspective view of the companion truss of the other bridge-leaf.

A represents the bridge section or leaf shown in Fig. 1, and B a portion of the free end of the companion bridge-leaf. Usually each bridge-leaf is provided with a truss at each side of the roadway or road-bed. The leaf A, as shown, comprises a truss A′ and a truss A^2, and the bridge-leaf B comprises corresponding trusses, of which only a portion of the truss B^2 is shown. Each truss A′ A^2 is composed of top chord a, bottom chords a^{13}, verticals a^5, and diagonals a^{12}, which are in the case illustrated built up of two channel-irons. For instance, for the top chord of truss A^2 these channel-irons are marked a and a'. These channel-irons are spaced some distance apart and have their flanges turned out or away from each other. The distance between these channels is preserved by tie-plates a^2 a^7 and a^{14} to a^{20}, inclusive, which are riveted to the flanges of the channels. These rivets are shown on plate a^2 riveted to the flanges of channels a and a'. At the intersection of non-parallel channel members with each other gusset-plates, as a^3 a^4, are used to make the connections between them.

The vertical members of both trusses A^2 and B^2 are used for connecting cross-beams b and d, usually I shape and called "floor-beams," joining the two trusses, which form each leaf of the bridge. These cross or floor beams support stringer-beams (not shown) similar in cross-section to the floor-beams c and d, which in turn support the wooden floor and street-car rails (not shown) for highway traffic or live loads.

The general construction and details of each of the trusses A′ A^2 and B′ B^2 are similar, and I have in the drawings applied to various connecting-plates of the truss B^2 the reference-letter c, with index-numerals corresponding to those of the letter b of the truss A^2. At the center of the bridge, however, where the two leaves nearly abut, and at the intersection of the members, top chord a, diagonal a^{12}, and vertical a^5 of truss A^2, the detail differs from the similar intersection on truss B^2. On truss A^2 a tongue composed in the case illustrated of two channel-irons a^8 and a^9, with their flanges turned in or toward each other, are placed between the channels a and a' of the top chord and riveted to them through the connection-plates a^3 and a^4, which lie between them. The outside or top chord channel-irons a and a' are cut off and do not extend out to the edge of the connec-

tion-plates a^3 and a^4, but extend over only a portion of the top of the channel-iron vertical members a^5 and a^6. The channel-irons a^8 and a^9 extend beyond the channel-irons a^3 and a^4, as shown. Their extended portions are bent or curved inward or toward each other and rigidly held in place by top and bottom tie-plates a^{10} and a^{11}, respectively, riveted to the flanges of the channel-irons, as shown. The rivets in the bottom plate-bearing are countersunk on the under side or cut off smooth with the bottom surface of the plate, which must present a perfectly smooth surface over all. The detail of truss B^2 at its similar point to this differs materially, as shown. The channels c and c' of the top chord of truss B^2 are extended and project beyond the edge of the gusset-plates c^3 and c^4 and beyond the tops of the channel-iron vertical members c^5 and c^6 the same distance the channel-irons a and a' are cut off.

It will be noted that the tie-plate a^2 does not project beyond the ends of the channel-irons a and a', to which it is riveted. The edge of the tie-plate c^2 is as far back from the end of the channel-irons c and c' as the ends of the tongue-channels a^8 and a^9 extend beyond the tie-plate a^2 or the ends of the channel-irons a and a', the tie-plate a^7, which is also used as a bearing-plate, affording a bearing-surface with the tops of the channel-irons a^5 and a^6 for the bottom surface of the channel-irons c and c' when the bridge is closed. Said plate a^7 is placed so that its top edge, which is faced smooth, extends up to and bears against the bottom flanges of the channel-irons a and a'. The tie-plate c^7, which acts also as a bearing-plate for the bottom of the tongue composed of the channel-irons a^8 and a^9 and plates a^{10} and a^{11} of truss A^2 when the bridge is closed, is placed so that the top edge, which is faced smooth, is as far below the bottom of the channel-irons b and b' as the plate a^{11} on the bottom of the tongue is thick.

The end construction of the trusses A' B' are respectively like those of the trusses A^2 and B^2, and the tongues on the leaf A and the shorter outside extensions on the leaf B and the bearings for said parts are the essential features of the invention.

In operation the bridge-leaf, composed of trusses B' B^2, with the short outside extensions of channel-irons b and b', is first rolled down from an open position of the bridge and stopped just short of a closed position, so that the upper and outside edge of plates a^7 on trusses A' A^2, composing the other leaf of the bridge, which immediately follows trusses B' B^2 in closing do not foul the bottom and end edges of channel-irons c and c' of truss B^2, but so that the bottom surface of the plate a^{11} comes in contact with and bears upon the top of bearing-plate c^7. When this occurs, the two leaves are rolled down simultaneously until both leaves come to rest in a closed position, and the bridge is then ready for highway or railroad traffic, as the case may be. As the two leaves are lowered simultaneously the smooth bottom surface of plate a^{11} slides over the top edge of the bearing-plate c^7, remaining in contact with the same when the leaves come to rest and the bridge is closed, and the bottom edges of the ends of the channels b and b' clear and pass over the upper edges of the ends of the plate a^7, so that when the leaves come to rest in a closed position the bottoms of the channel-irons c and c' bear upon the top edge of plate a^7 and the ends of the channel-irons a^5 and a^6. Thus a support is provided at the end of each truss of each bridge-leaf for the end of the corresponding truss of the other bridge-leaf. Moreover, by reason of the provision that the tongue of one truss shall be longer than the projections of the companion truss the bridge is readily closed without the necessity of timing or determining carefully the movements of the two bridge-leaves. In other words, it is only necessary that the leaf composed of trusses B' B^2 be lowered in advance of the leaf composed of trusses A' A^2, and held in such position, within comparatively wide limits, so that the tongues of trusses A' A^2 will engage the appropriate bearings, plates c^7 of the trusses B' B^2, during the final movement of the leaf composed of trusses A' A^2 in passing to the closed position. By reason of the bent or curved side channel-irons a^8 and a^9 of the tongues the bridge-trusses, and thus the leaves and rails, are brought into perfect horizontal alinement as these tongues enter the sockets afforded between the channel-irons c and c' of the trussess B' B^2 of the opposite leaf. After the trusses have been properly interlocked it is obvious that a lateral play of either truss with relation to the other is prevented and that it is not possible for one leaf end to sink below the level of the other leaf end. This enables the road-bed to be maintained perfectly level and even, so that where rails are employed thereon they are kept in perfect alinement. Moreover, the leaves meet in such a manner as to avoid all horizontal stress, thereby allowing for expansion, as will be evident from Figs. 2 and 3.

It will be understood that any suitable means may be provided for operating the bridge-leaves and that suitable expedients will be employed for indicating to the operator the relative positions of the bridge-leaves during their movements.

Changes in minor details of 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.

The invention is peculiarly applicable to bridges of the cantaliver type, as distinguished from bridges of the arch type, although the bent or wedge-shaped tongue may be used to aline the trusses of the arch type as well, and it is intended where this construction is employed to so lock the pier ends of the leaves

or to provide other suitable means that there shall be no tendency for the leaves to swing upwardly after they have been lowered to the closed position.

As is generally known, bridges of the character described have their trusses formed of structural rolled metal, usually steel. By building the interlocking parts of metal of the same general nature a thoroughly safe connection for the bridge-leaves is provided.

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

1. In a bridge of the class mentioned, having two vertically-swinging bridge sections or leaves meeting at their free ends, a socket carried by one bridge-section and having bottom and lateral bearing-surfaces, an extension carried by the other bridge-section and having flanking bearings, said extension being adapted to enter said socket, and shorter projections upon the first bridge-section adapted to rest upon said flanking bearings, substantially as described.

2. In a bridge of the character described, having movable sections meeting at their free ends, a plurality of trusses for each section, each truss having a longitudinal beam built up to afford a space between the beam members, tongues being provided at the beams of one bridge-section and secured between the beam members thereof, and the spaces between the beam members of the companion trusses being preserved to receive said tongues, substantially as described.

3. In a bridge of the character described, having vertically-swinging sections meeting at their free ends, the combination of a truss for one section having a built-up beam of structural metal, members of said beam projecting beyond the end of the truss and the space being preserved between said members to afford a socket, having lateral and bottom bearings, and a companion truss for the other bridge-section having a built-up beam, a built-up tongue or projection secured between the members of said last-named beam and projecting beyond the end of said truss, and flanking bearings adapted to receive the projecting ends of the members of the companion beam, substantially as described.

4. In a bridge of the character described, having vertically-swinging sections meeting at their free ends, the combination of a truss B^2 having a beam formed with members c, c' affording a socket between them, uprights c^5, c^6 connected with said members, a connecting member c^7 at the base of said beam, the ends of said members c, c' projecting beyond said connecting member, and a companion truss A^2 for the other bridge-section having a beam formed with members a, a', a tongue secured between the members a, a' and projecting beyond the ends thereof and comprising members a^8, a^9, uprights a^5, a^6 connected with the members a, a', and a connecting member a^7 at the base of said projecting tongue and extending beyond the lateral surfaces thereof, substantially as and for the purpose set forth.

5. In a bridge of the character described, having vertically-swinging sections meeting at their free ends, the combination of a truss provided with a socket, having a bottom and lateral bearings, relatively short extensions for said truss flanking said socket, and a companion truss for the other bridge-section having a tongue adapted to fit into said socket, said tongue having laterally curved or beveled surfaces, and bearings flanking the base of said tongue and adapted to receive the projections flanking said socket, substantially as and for the purpose set forth.

6. In a bridge of the character described, having vertically-swinging sections, the combination of a truss for one section having a beam formed with channel-beams c, c' having oppositely-turned flanges, a socket being preserved between the webs of said beams, a bearing for a tongue beneath said socket, and a companion truss for the other bridge-section having a girder formed with channel-beams a, a' having oppositely-turned wings, a tongue comprising channel-bars having their wings turned toward each other, said channel-bars being secured between said last-named channel-beams, and bearings flanking the base of said tongue to receive the projecting ends of the beams c, c', substantially as and for the purpose set forth.

7. In a bridge having movable sections meeting at their free ends, a plurality of trusses for each section, the trusses of one section having tongues and bearings flanking the bases of said tongues, and the trusses of the other section having sockets for said tongues and flanking relatively short extensions for engaging the bearings flanking the bases of said tongues, substantially as described.

8. In a bridge having movable sections meeting at their free ends, a plurality of trusses for each section, each truss having a built-up beam formed with members separated by a space, tongues inserted and fixed between the members of each of said beams of one bridge-section, bearings flanking the bases of said tongues, and sockets between the members of each of said beams of the other bridge-section, said sockets having at their bases bearings for said tongues and flanking their bases relatively short extensions for engaging the bearings flanking said tongues, substantially as described.

CHARLES L. KELLER.

In presence of—
D. W. LEE,
ALBERT D. BACCI.