(No Model.) 13 Sheets—Sheet 1.

J. V. MEIGS.

RAILWAY.

No. 313,830. Patented Mar. 10, 1885.

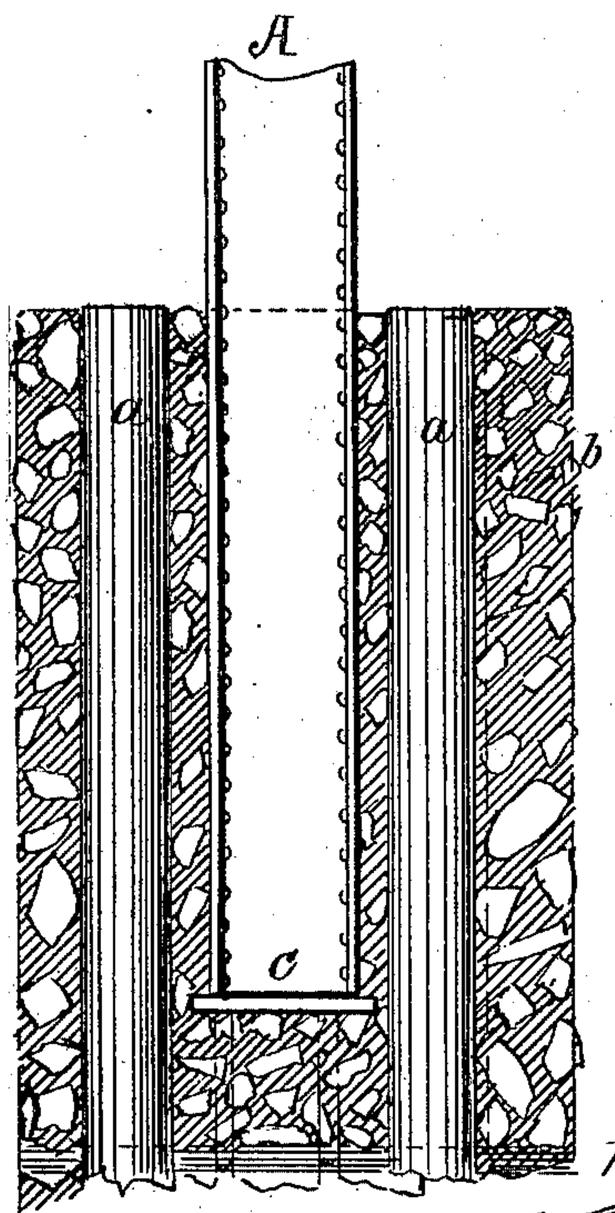
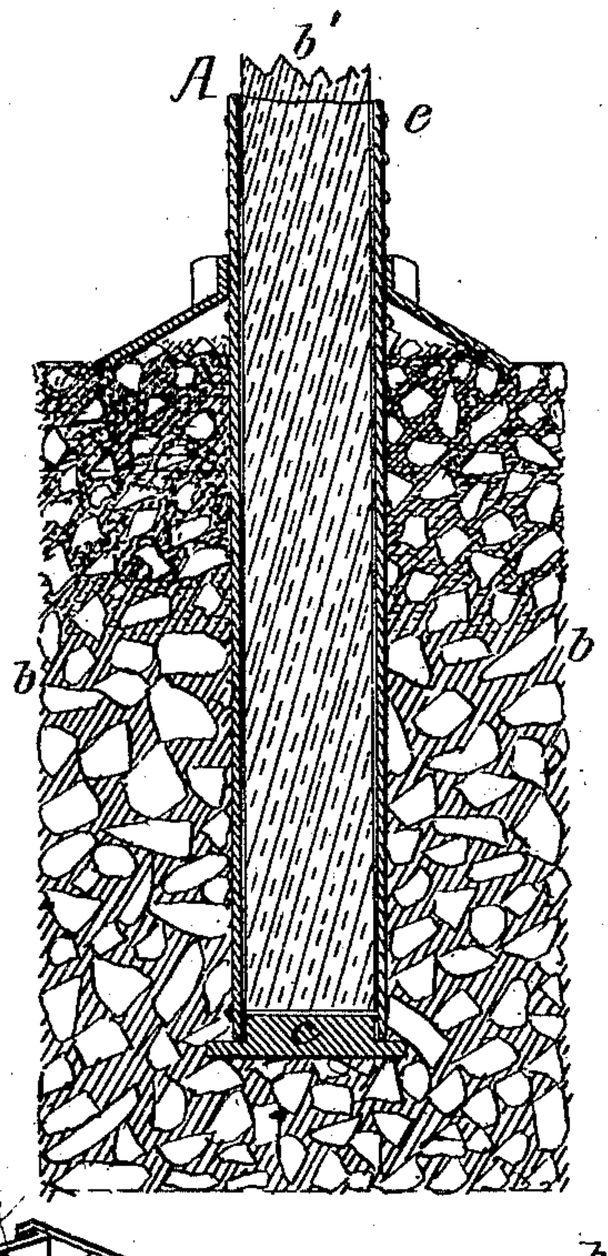


Fig. 1.



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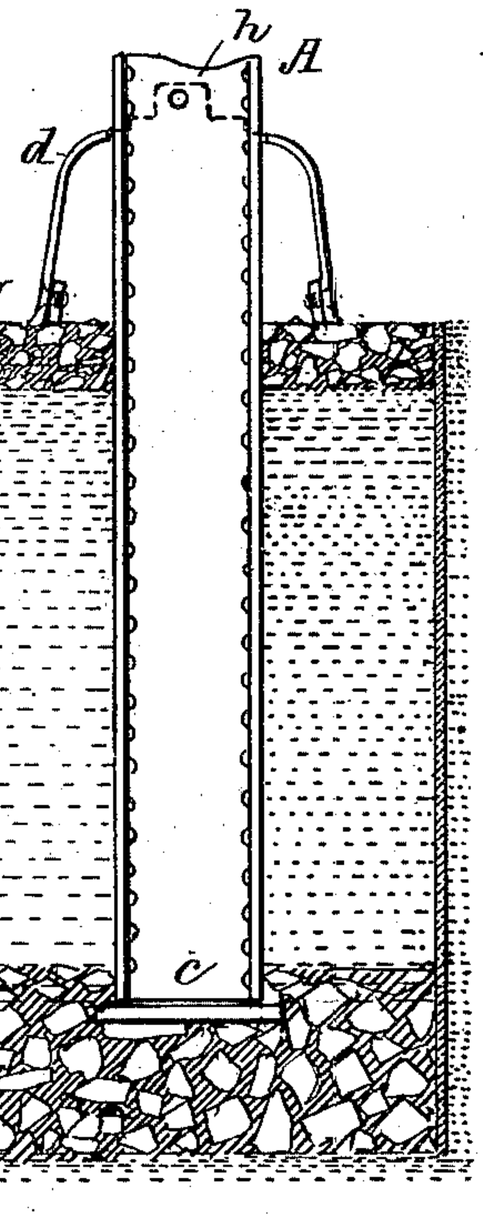

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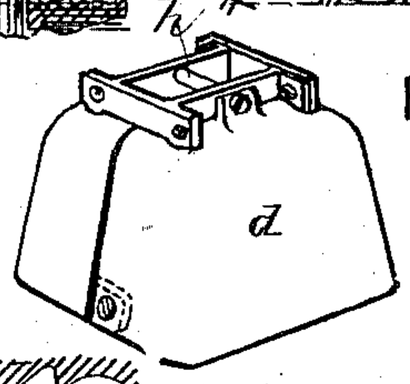

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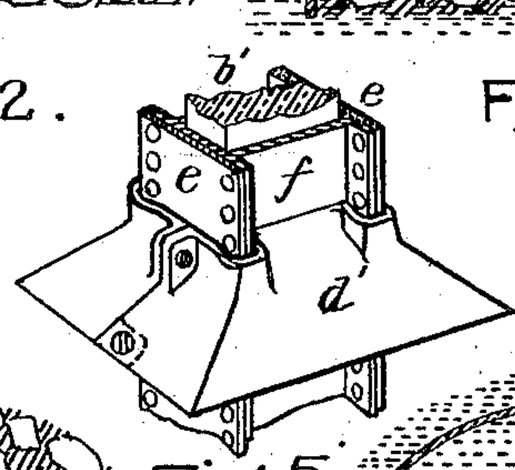

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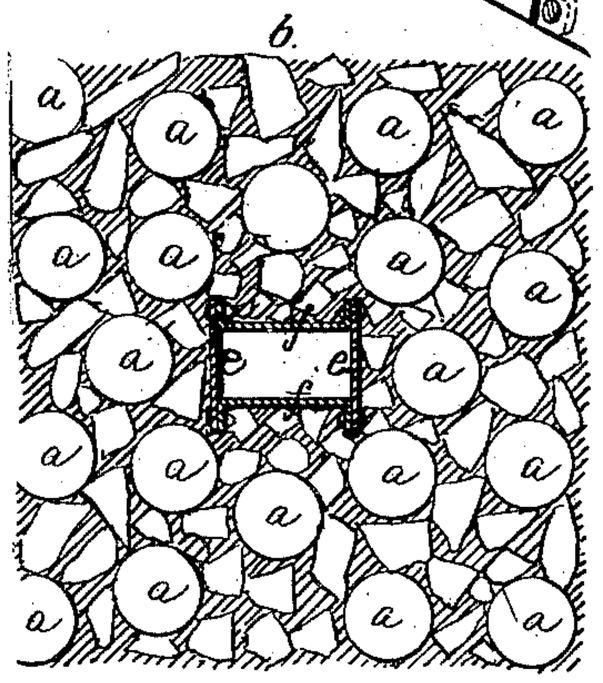

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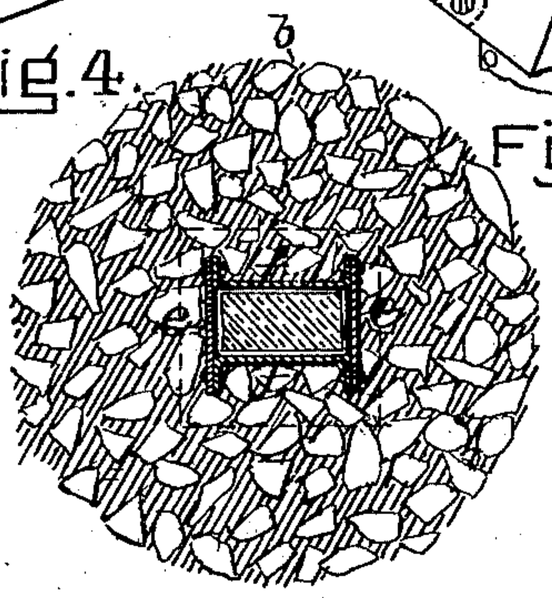

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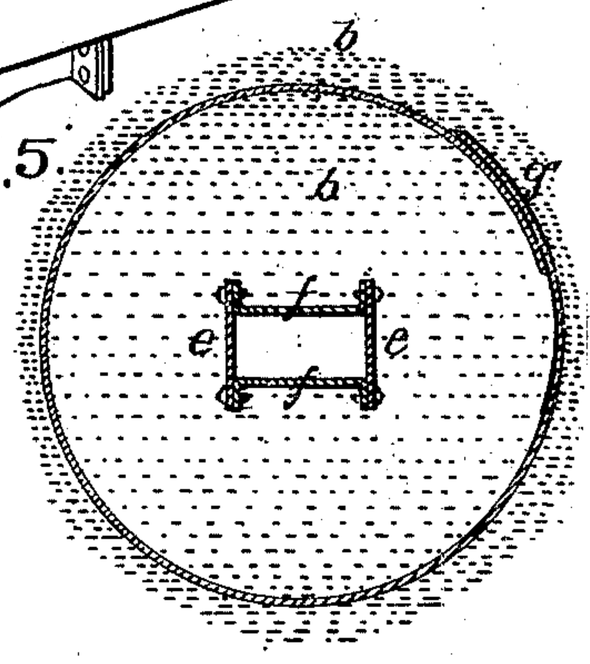

Fig. 8.

WITNESSES.

Fred. Haynes

Bowdoin S. Parker.

Jno V. Meigs

INVENTOR.

by his Attys

Baxter & Raymond

N. PETERS, Photo-Lithographer, Washington, D. C.

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J. V. MEIGS.

RAILWAY.

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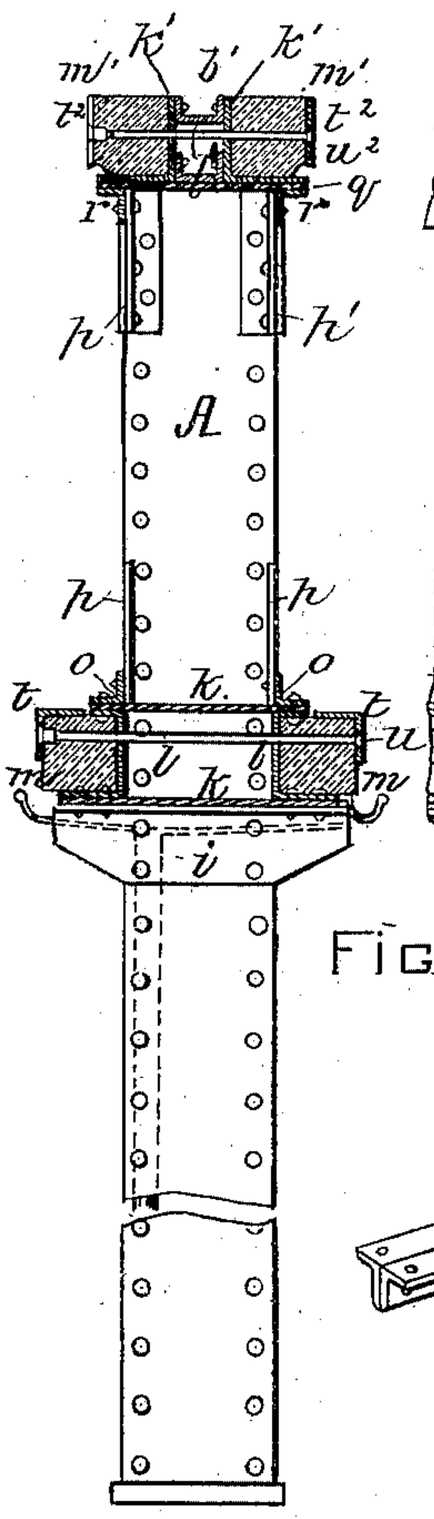

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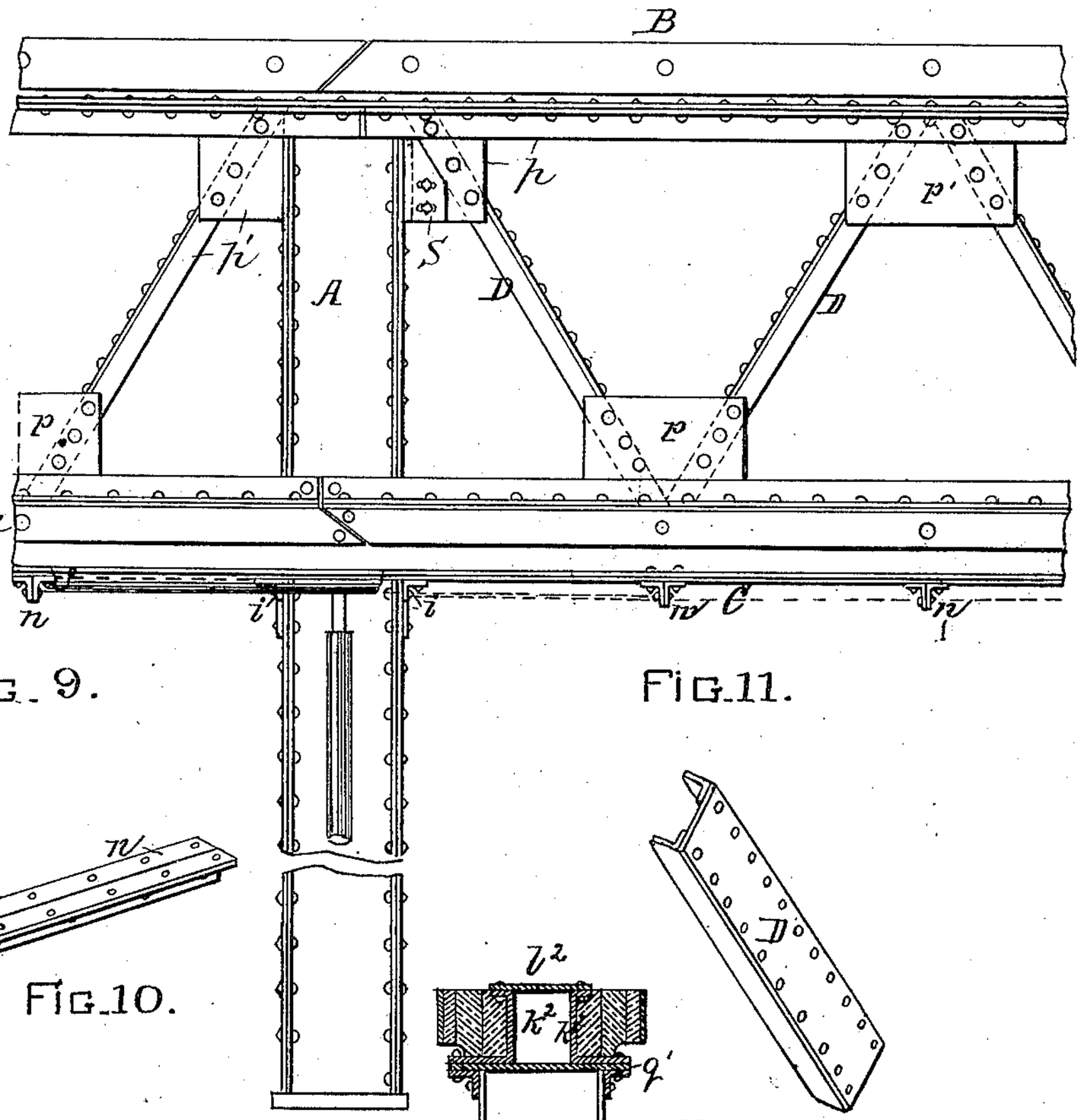
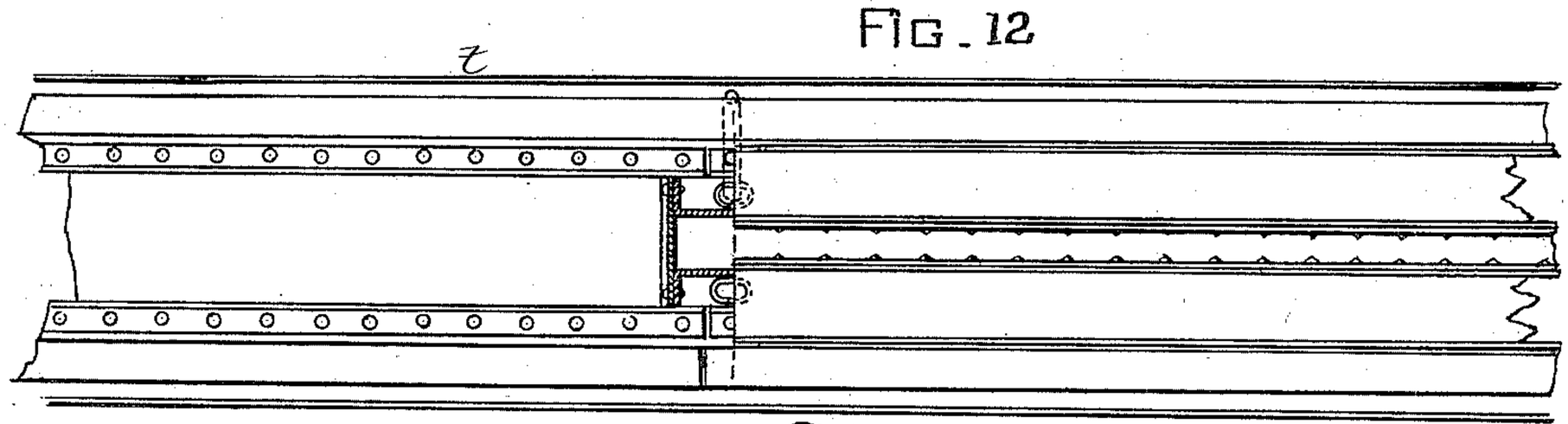


Fig. 11.

Fig. 10.

Fig. 12

Fig. 13.



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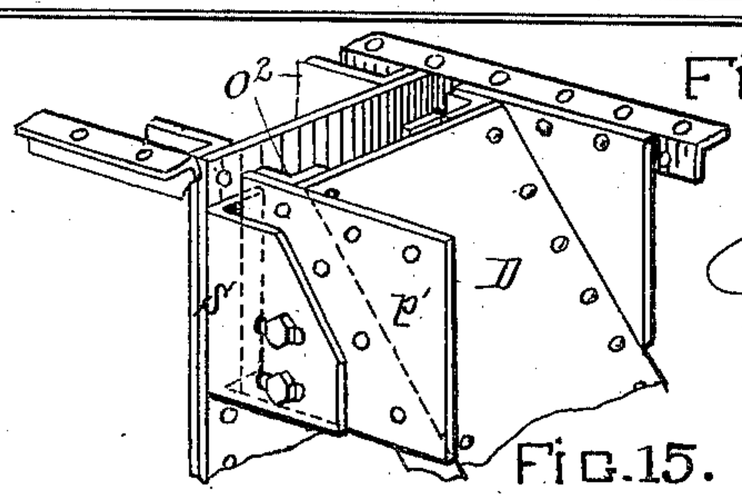

Fig. 15.

WITNESSES

Fred. Harris

Bowdoin S. Parker.

Jas. V. Meigs

INVENTOR

by his Attys

Parker & Raymond

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J. V. MEIGS.

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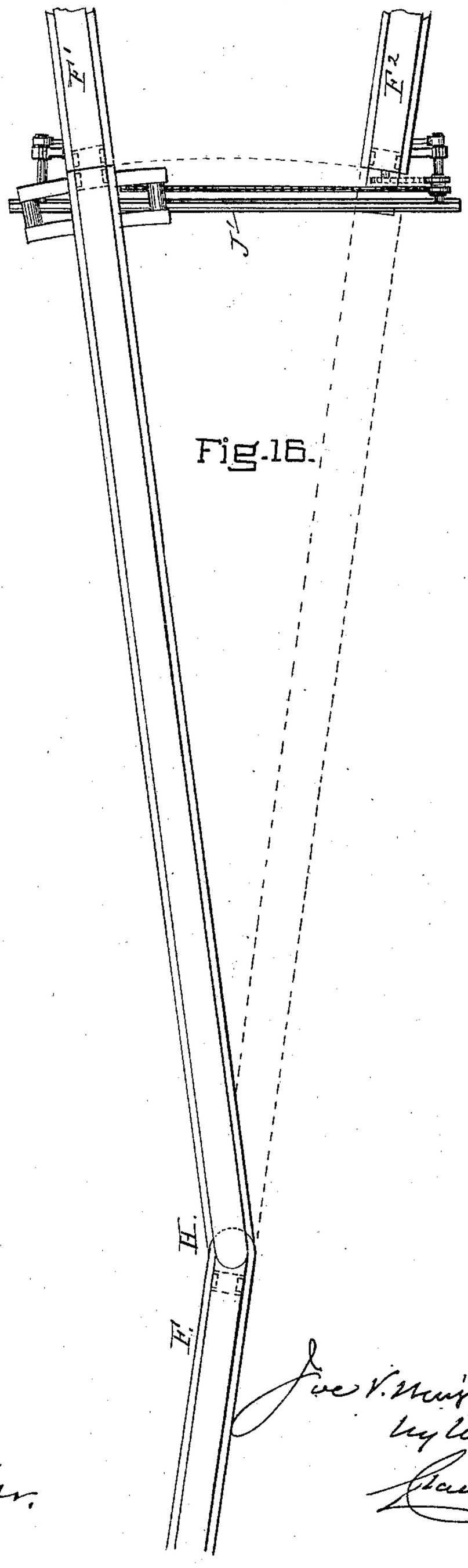

Fig. 16.

Witnesses
Fred. Harris
Bowdoin S. Parker.

Joe V. Meigs INVENTOR.
by his Attys.
Clarke & Raymond

N. PETERS. Photo-Lithographer, Washington, D. C.

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RAILWAY.

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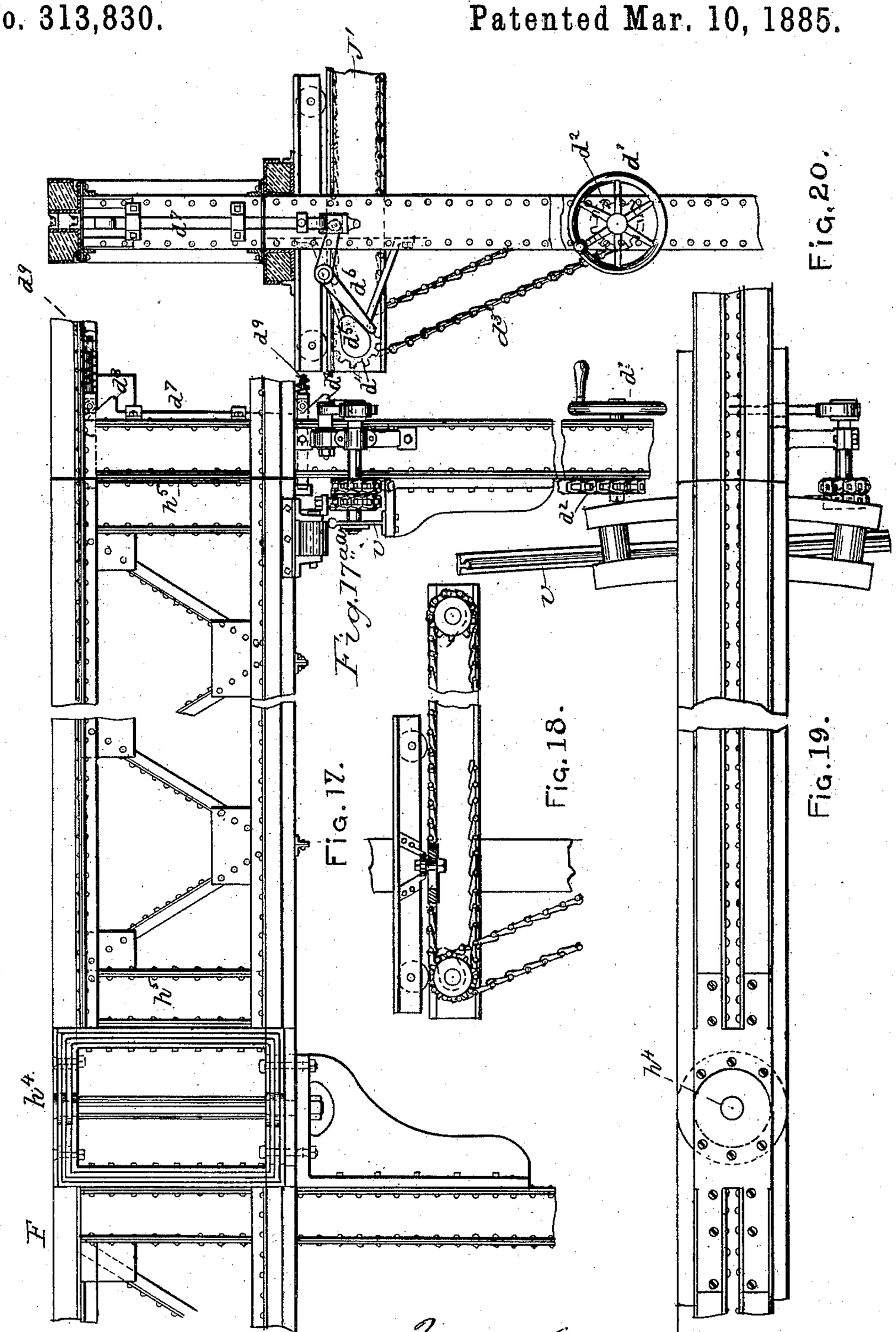

Fig. 20.

Fig. 17a.

Fig. 17.

Fig. 18.

Fig. 19.

WITNESSES—

Ind. Harris

H. T. Raymond 2d

Jno. V. Meigs
by his atty
Chas. H. Seymour

INVENTOR—

N. PETERS. Photo-Lithographer. Washington. D. C.

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J. V. MEIGS.

RAILWAY.

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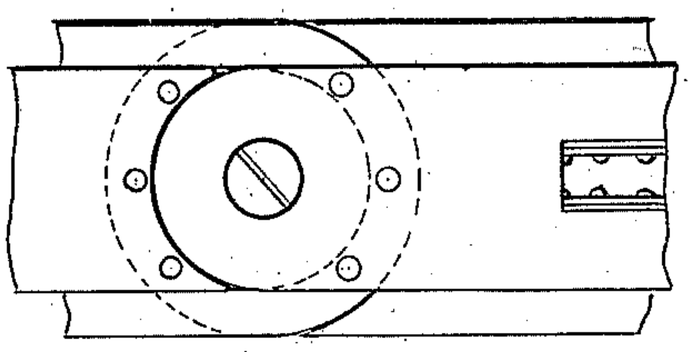

Fig. 24.

Fig. 21.

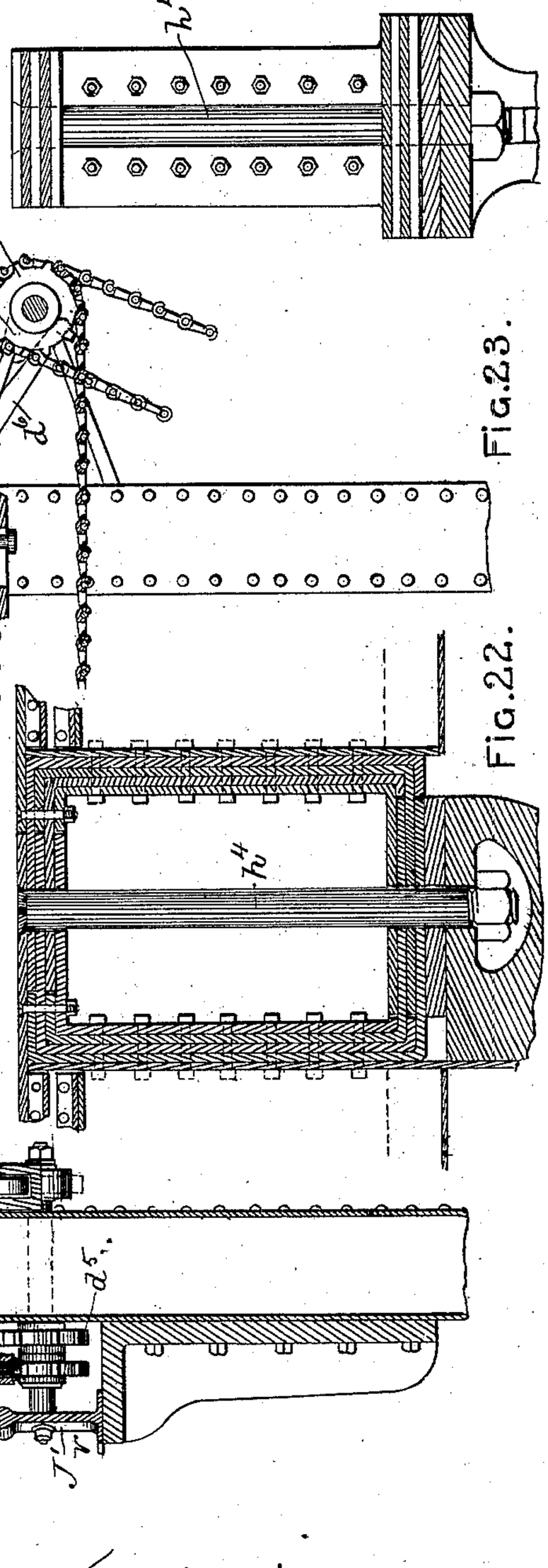

Fig. 25.

Fig. 23.

Fig. 22.

WITNESSES.

Fred Harris

F. F. Raymond

Jae V. Meigs INVENTOR.

by his Atty,

Chas. Shepard

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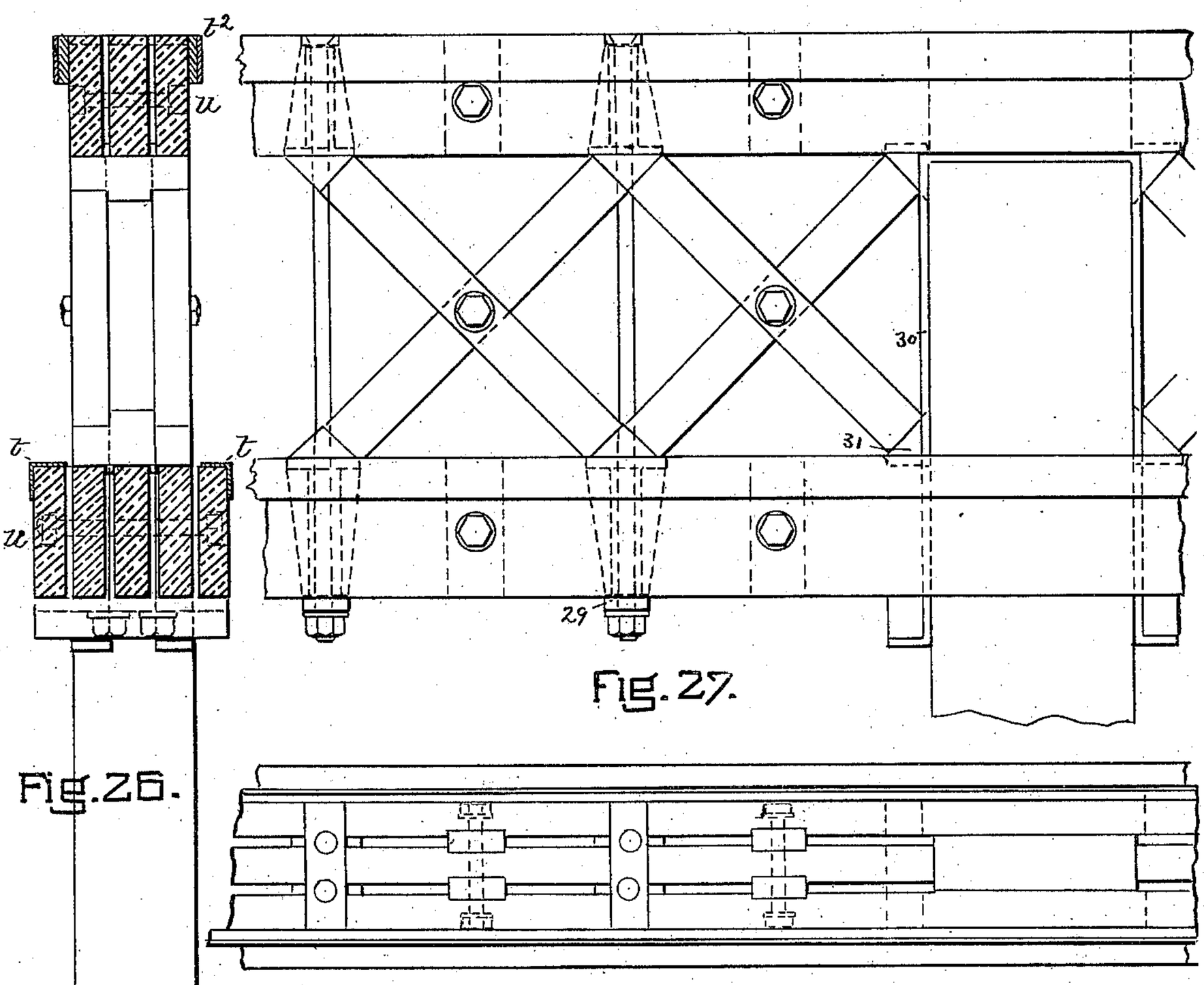
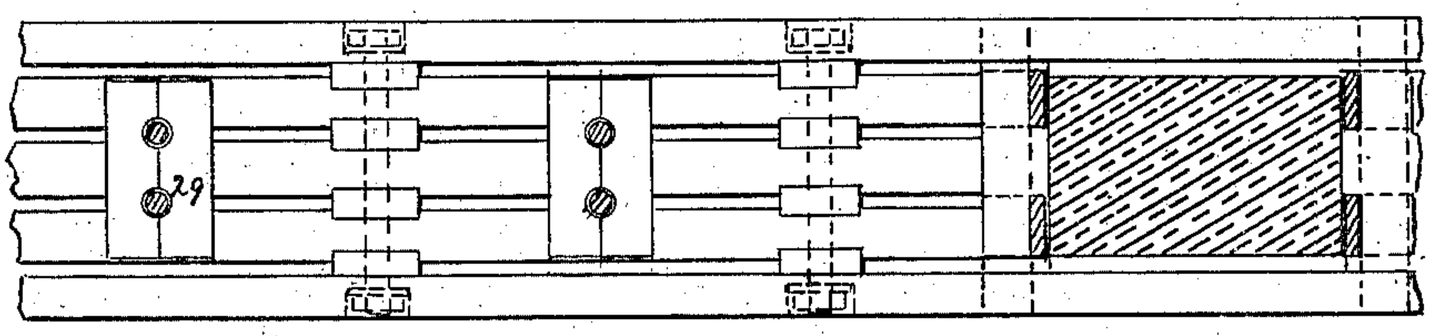
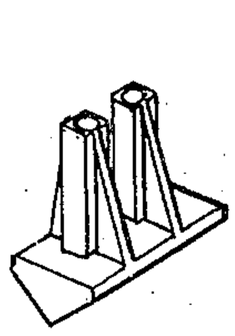


Fig. 27.

Fig. 26.

Fig. 28.





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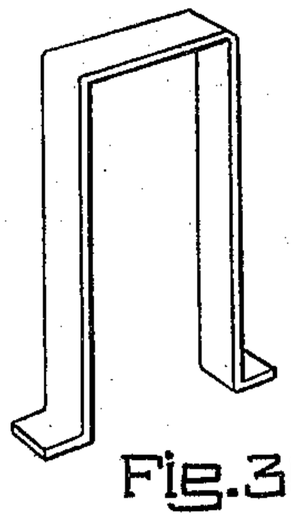

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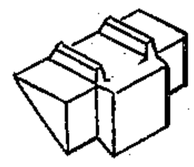

Fig. 31.

WITNESSES.

Fred. Harris

Bowdoin S. Parker.

Jas. V. Meigs

INVENTOR.

by his attys.

Lemuel W. Serrell

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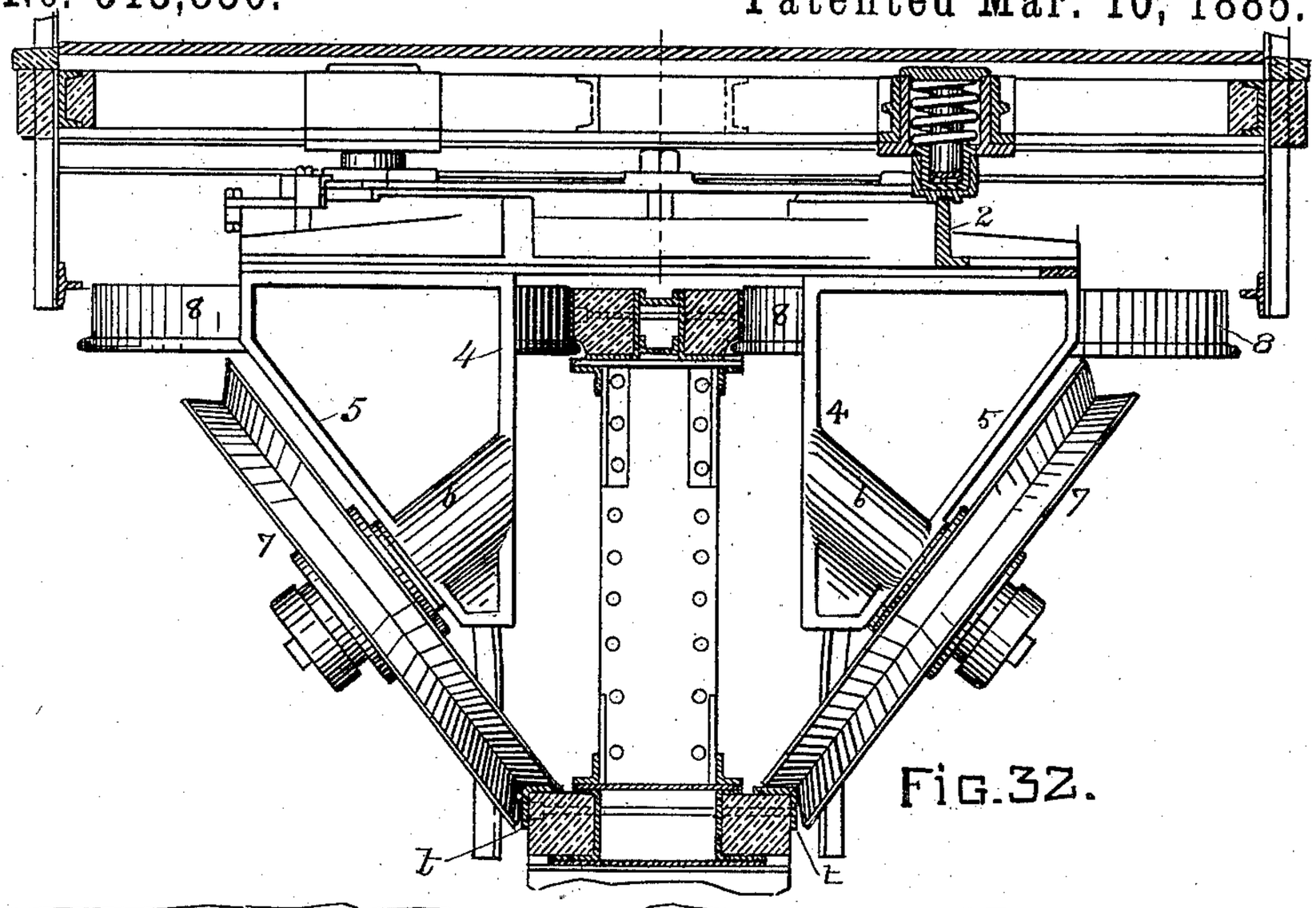

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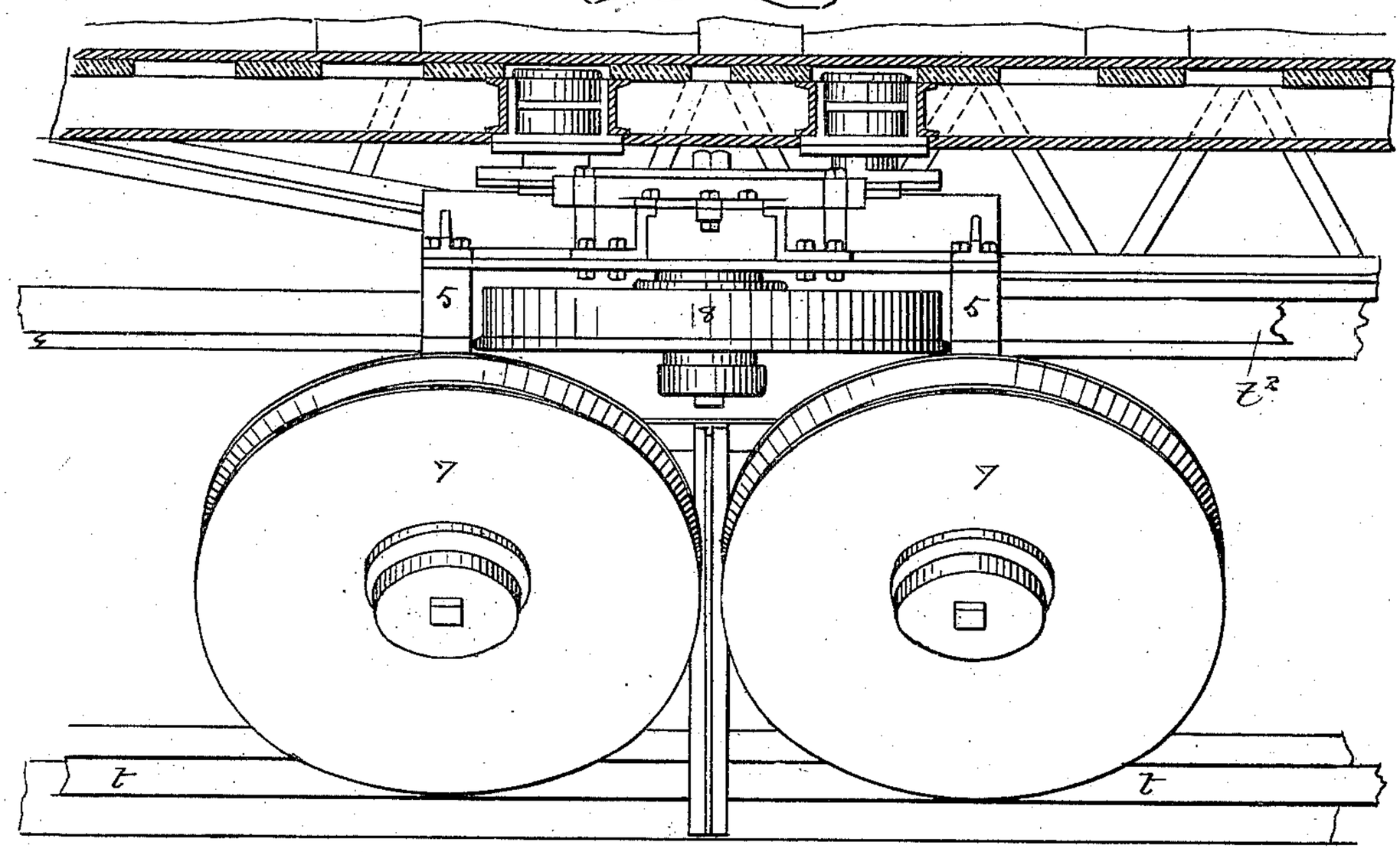

Fig. 33.

WITNESSES
Fred. Harris
Bowdoin S. Parker.

Joe V. Meigs INVENTOR
by Charles H. Seymour
ATTORNEY

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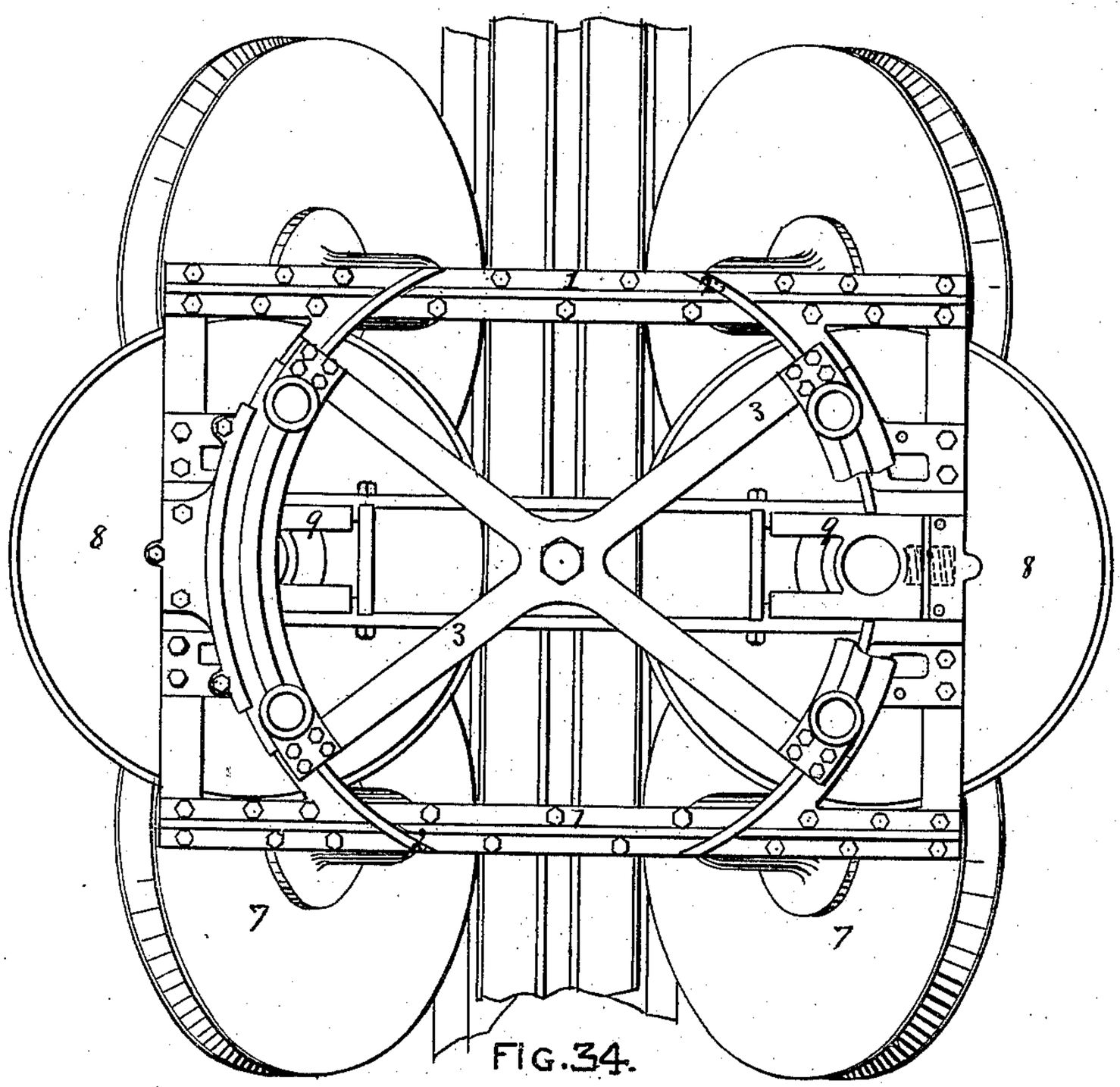

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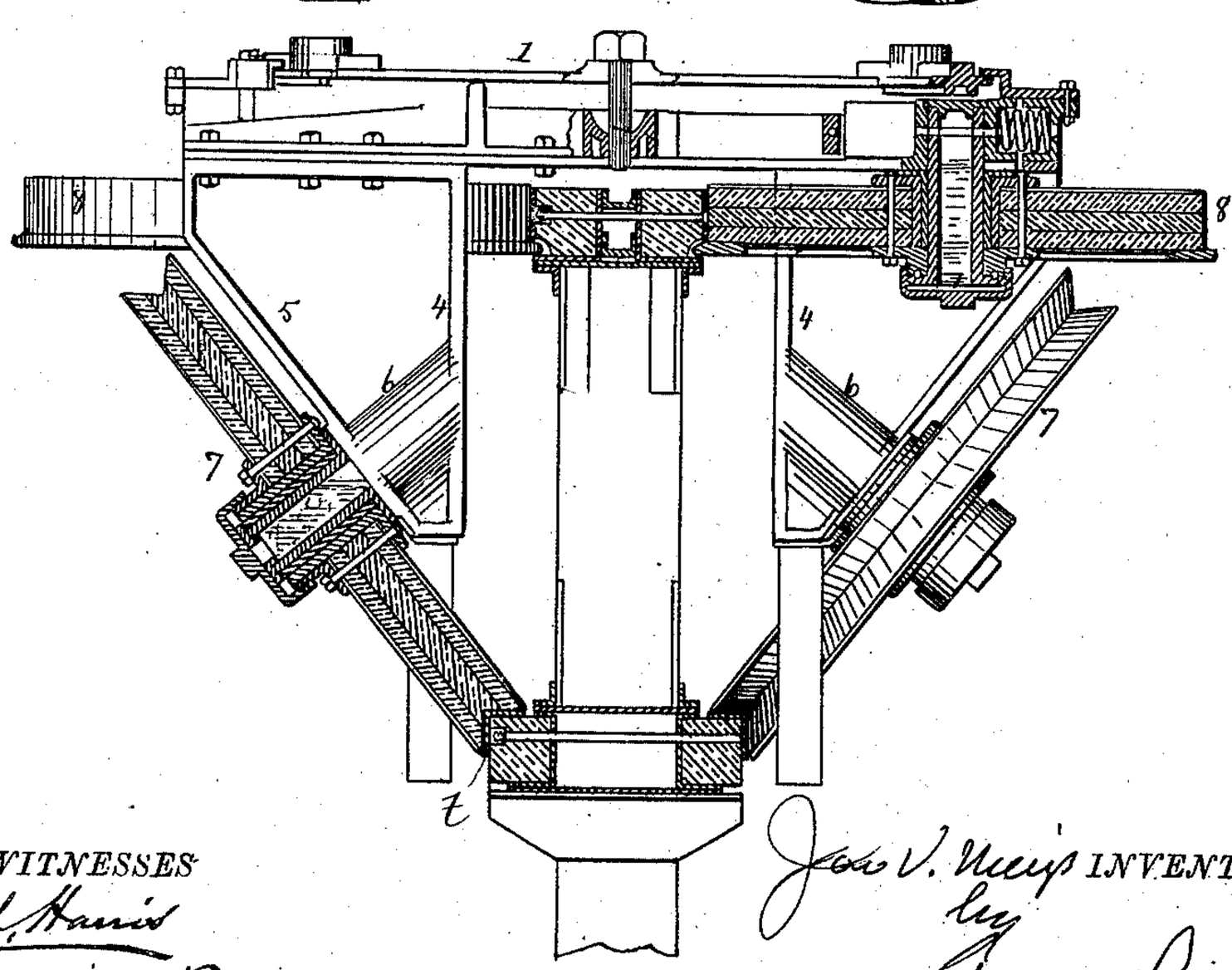

FIG. 35.

WITNESSES

Fred. Harris

Bowdoin S. Parker.

John V. Meigs INVENTOR

by Cooke & Raymond

Attorney

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J. V. MEIGS.

RAILWAY.

No. 313,830. Patented Mar. 10, 1885.

Fig. 36.

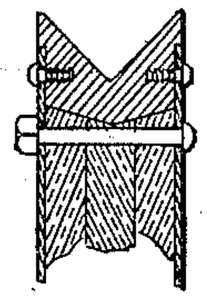


Fig. 37.

Fig. 38.

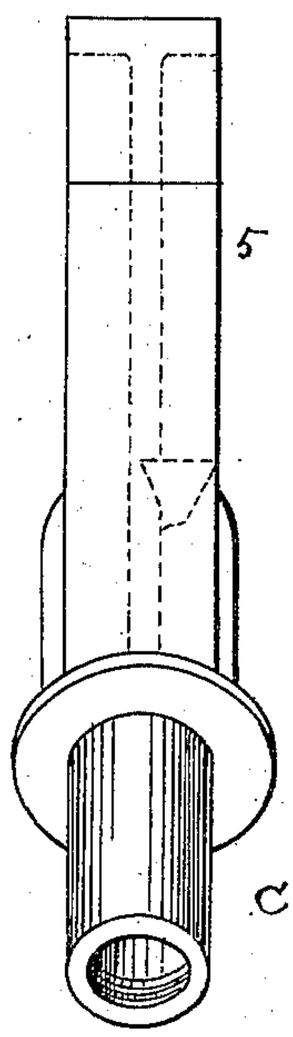
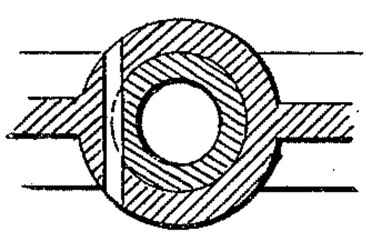


Fig. 39.

Fig. 40.



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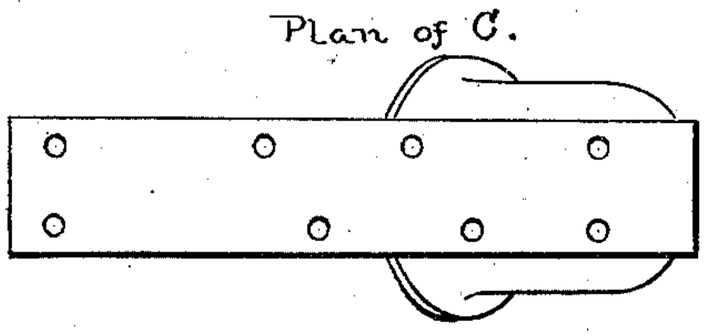

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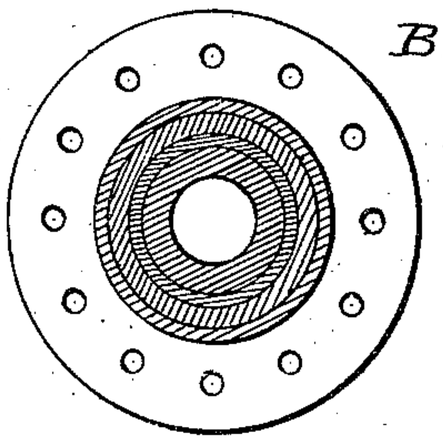

WITNESSES

Fred. Harris

Bowdoin S. Parker.

Jno. V. Meigs INVENTOR

by Clarke & Raymond

Attorney

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J. V. MEIGS.

RAILWAY.

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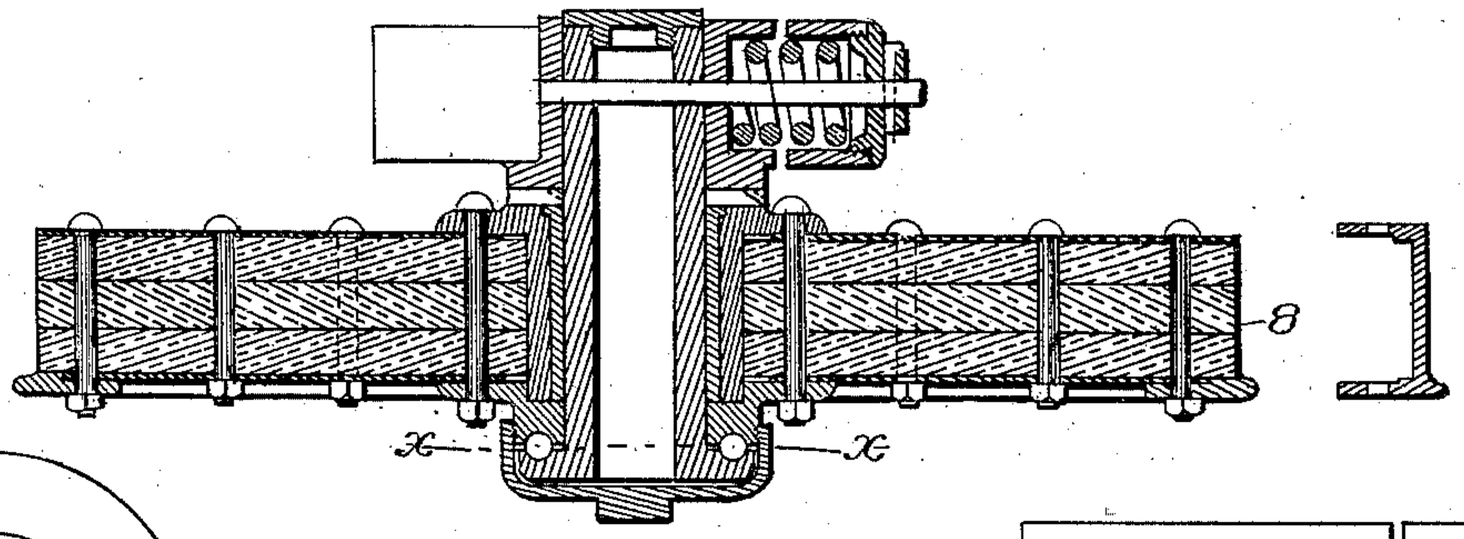

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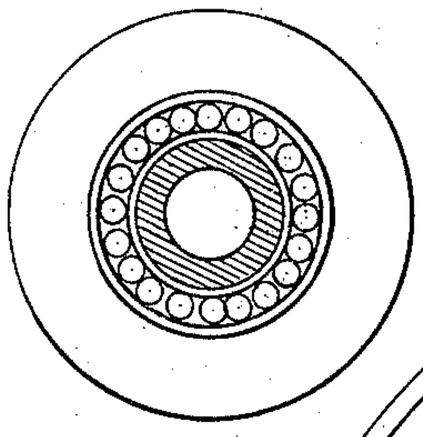

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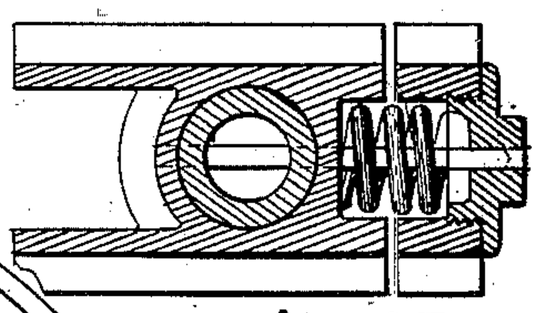

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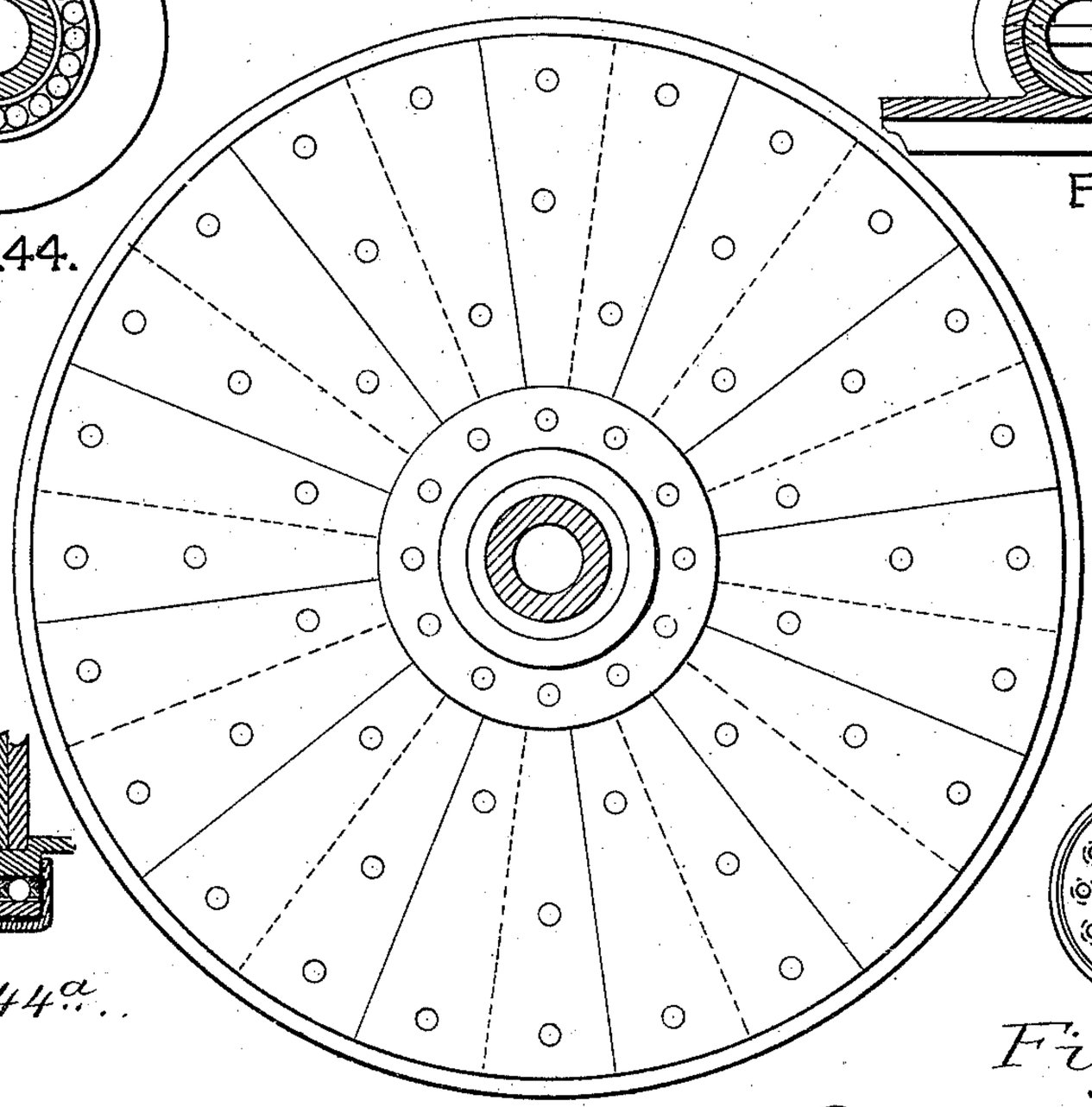

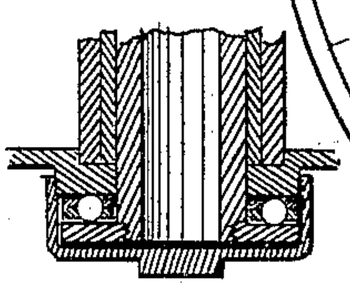

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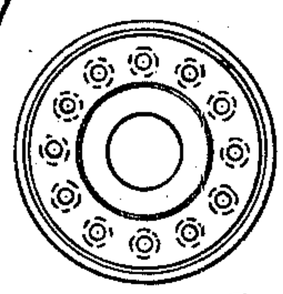

Fig. 44b.

Fig. 46.

WITNESSES.

Fred. Harris

Bowdoin S. Parker.

Jas. V. Meigs

INVENTOR.

by Clarke & Carpmael

Attys

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J. V. MEIGS.

RAILWAY.

No. 313,830. Patented Mar. 10, 1885.

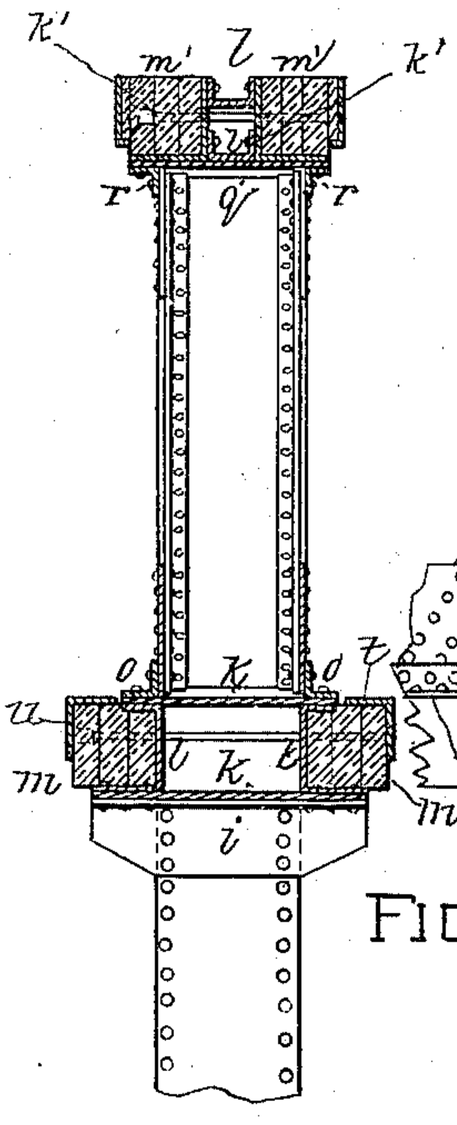
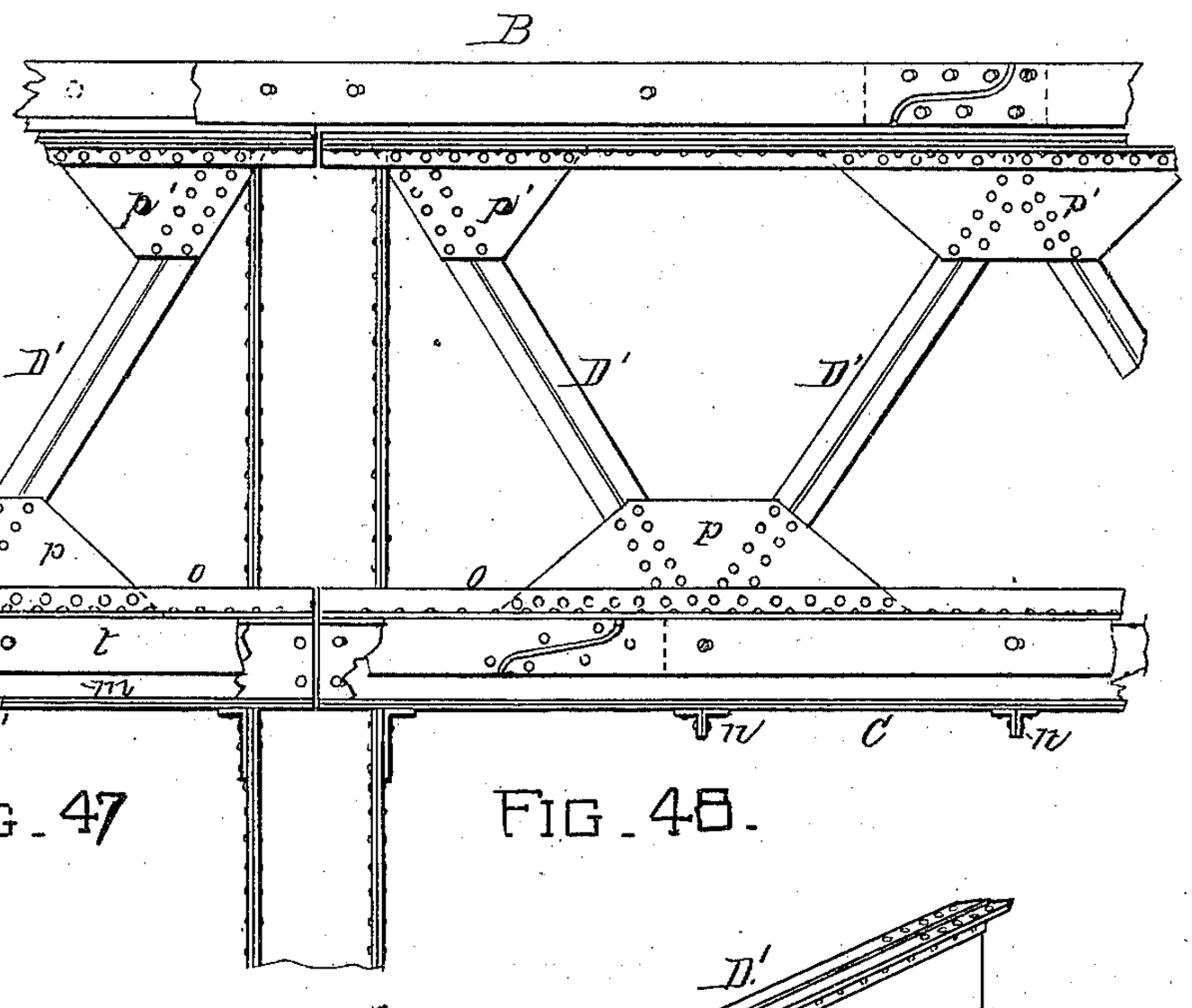


FIG. 47



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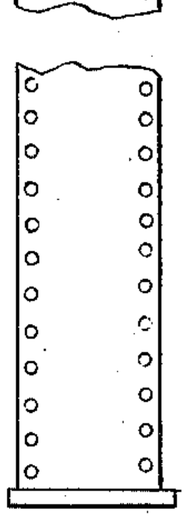
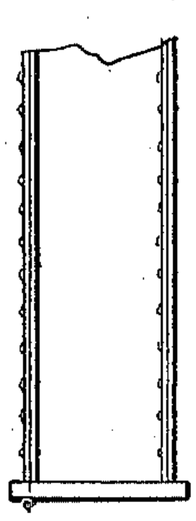




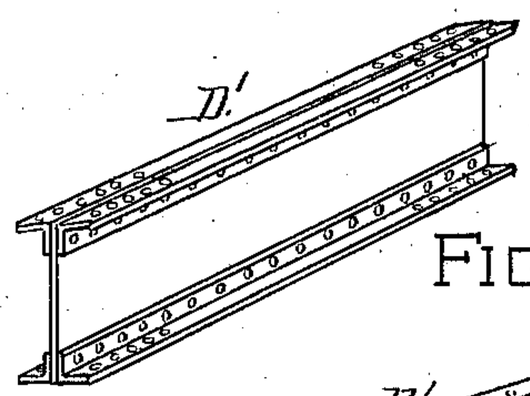
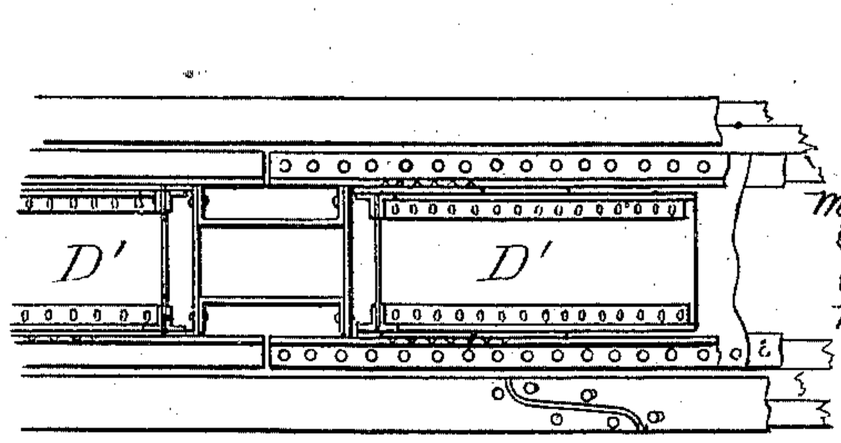


FIG. 49.

FIG. 50.



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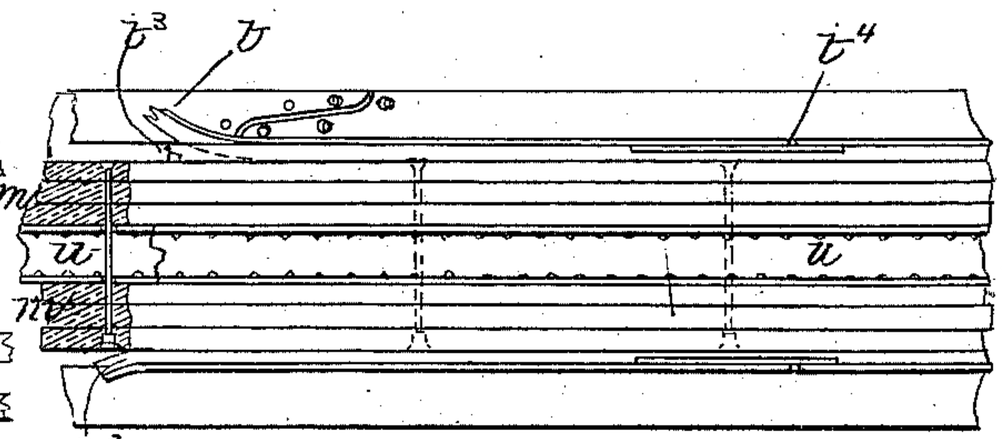

FIG. 52.

WITNESSES.

Fred. Harris

Bowdoin S. Parker.

Jas. V. Meigs

INVENTOR.

by his attys

Sachs & Poynton

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J. V. MEIGS.

RAILWAY.

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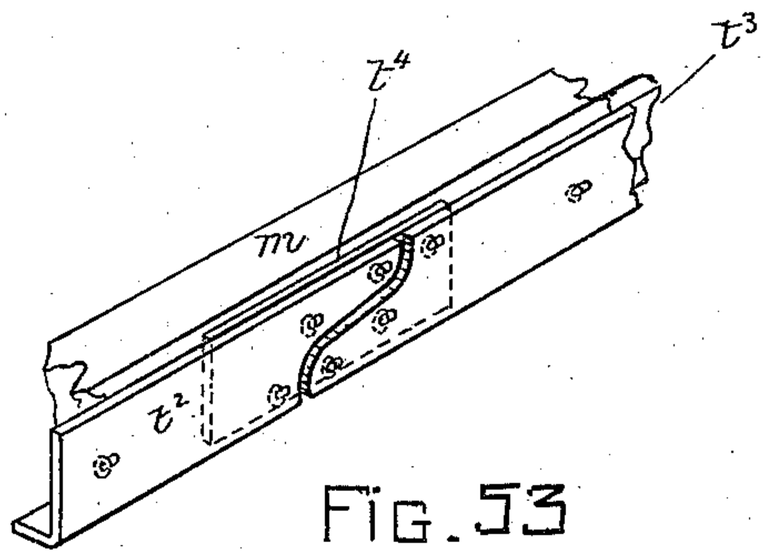
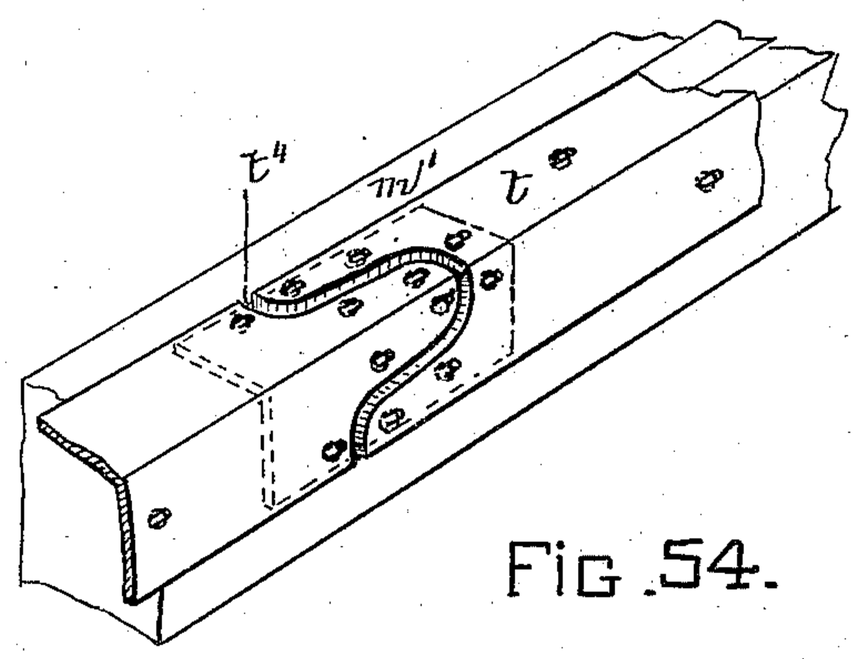


FIG. 53



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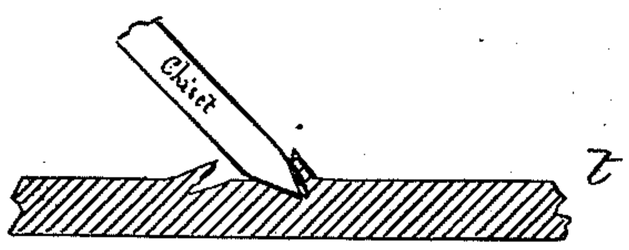

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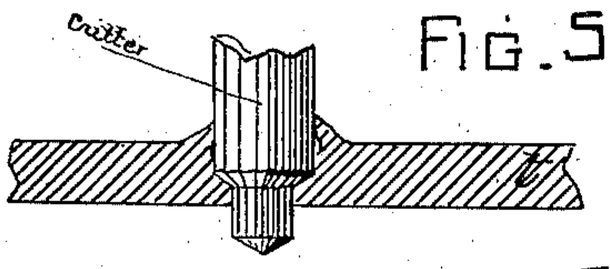
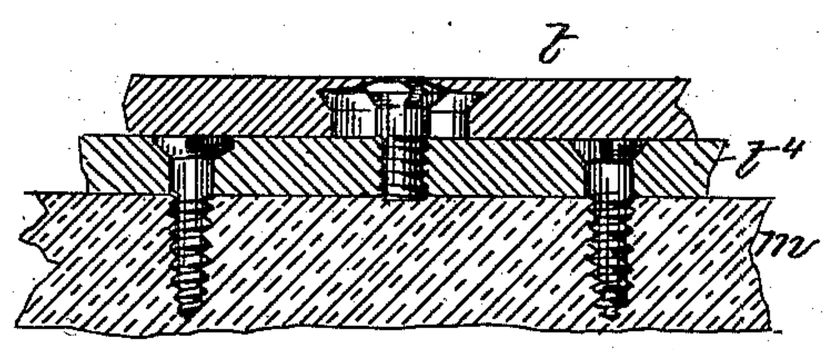


FIG. 56.

FIG. 58



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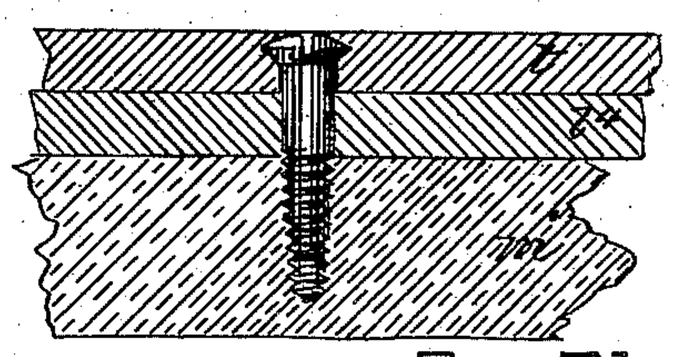

FIG. 61.

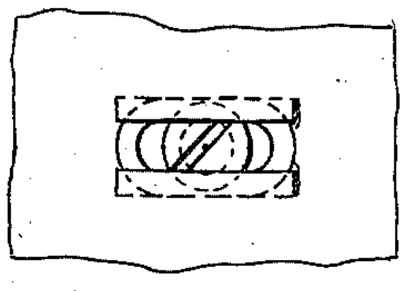

FIG. 59.

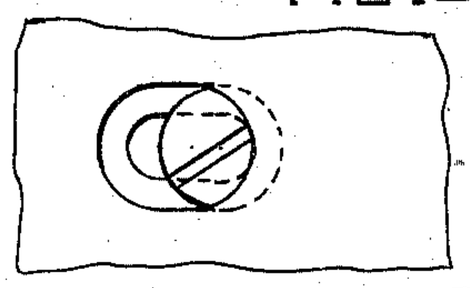

FIG. 60.

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(No Model.)

13 Sheets—Sheet 13.

J. V. MEIGS.

RAILWAY.

No. 313,830. Patented Mar. 10, 1885.

FIG. 63.

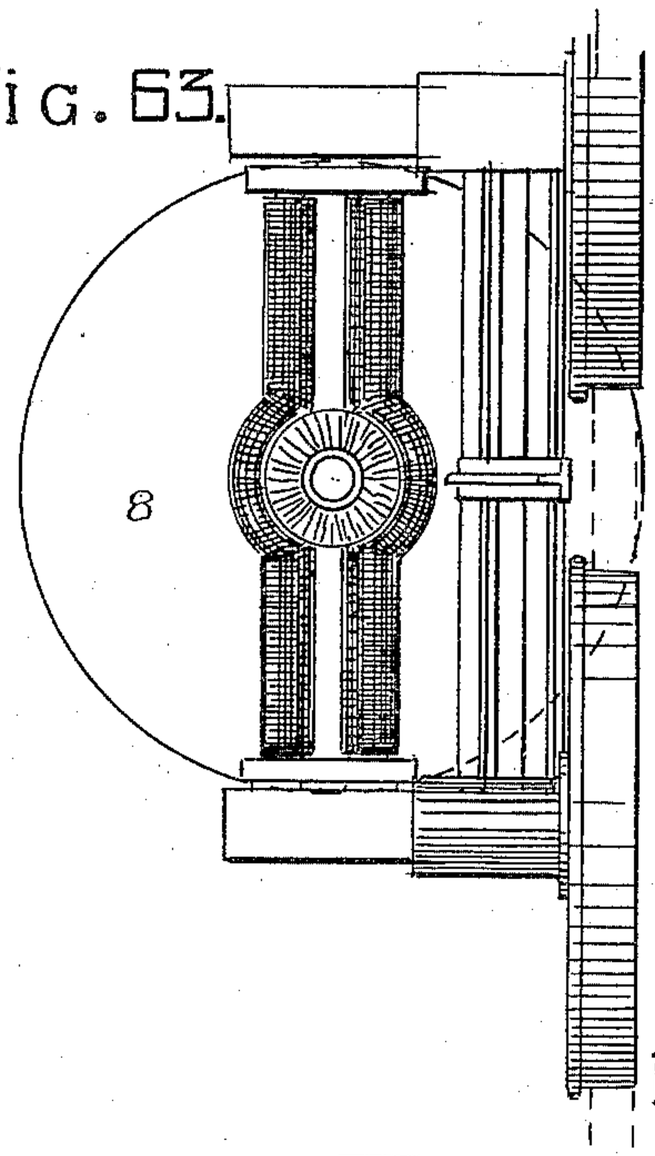


FIG. 62.

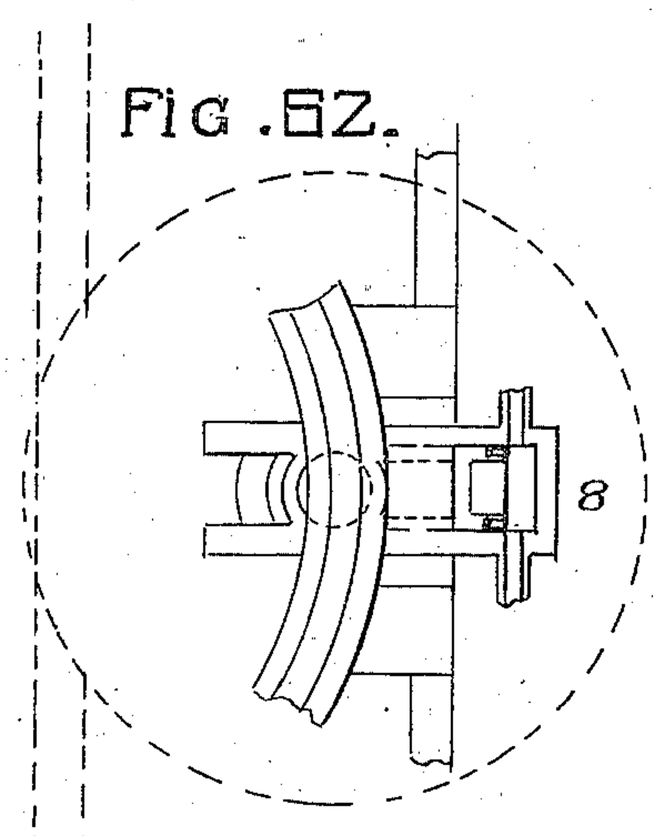
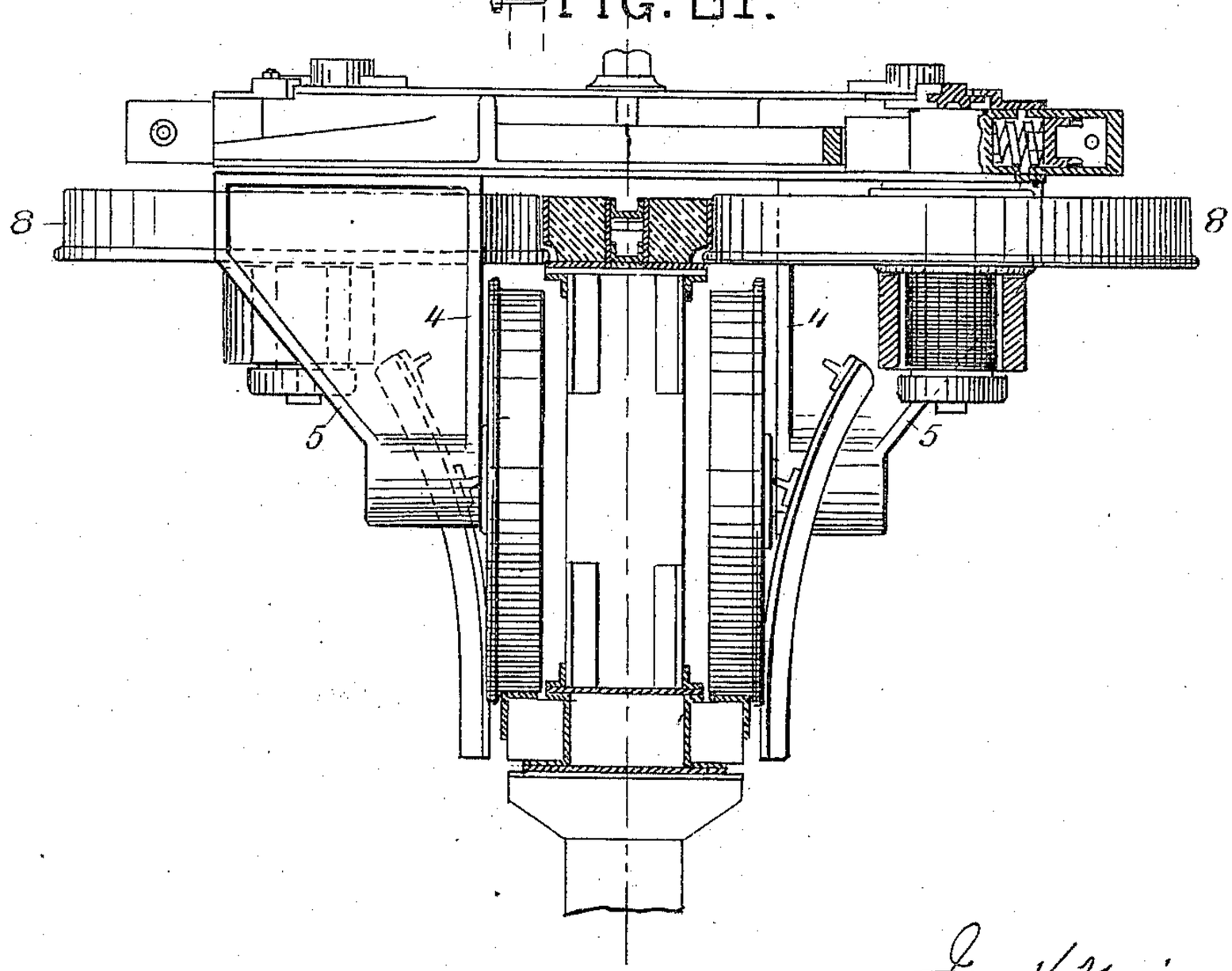


FIG. 61.



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UNITED STATES PATENT OFFICE.

JOE V. MEIGS, OF LOWELL, MASSACHUSETTS.

RAILWAY.

SPECIFICATION forming part of Letters Patent No. 313,830, dated March 10, 1885.

Application filed January 30, 1884. (No model.)

To all whom it may concern:

Be it known that I, JOE V. MEIGS, of Lowell, in the county of Middlesex and State of Massachusetts, have invented a certain new and useful Improvement in Railways, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification in explaining its nature.

This invention relates to the way and truck system of post-supported railways, and is intended to provide a girder and truck system for such railways interdependent on each other, and in which the truck attached to the car shall be locked upon the girder, so as to prevent derailment. The girder carries four rails or surfaces on which the wheels revolve, and the truck has four or more wheels. The way is composed of five principal composite parts—namely, the foundation, the posts, the girder, the rails, and switch. The truck is composed of three principal composite parts—namely, the truck-frame, the bearing-wheels in their arrangement upon the truck-frame, and the friction-wheels, also mounted in the truck-frame. Such trucks being useless for the ordinary form of railway, and only practicable with this form of way as they ride astride the girder, and this form of way being only adapted to receive this special form of trucks, it will be seen that the whole constitutes an invention having a single purpose.

In the drawings, Sheet 1 shows the foundation and lower portion of the supporting-posts. Sheet 2 shows the upper portion of the posts and the girder. Sheet 3 contains a sketch plan of the switch. Sheets 4 and 5 represent details of the switch. Sheet 6 shows a modification of the girder and truss adapted to be made mainly of wood. Sheet 7 contains an end elevation and a side elevation of the truck, showing its adjustment upon the girder. Sheet 8 contains a top plan and a cross-section of the truck system, showing its adjustment upon the girder. Sheets 9 and 10 contain various details of the truck system and its wheels and their adjustment. Sheets 11 and 12 contain modifications of the girder and its details shown in Sheet 2, adapting the girder to electrical motive force transmitted on the rails, which is a method of fastening the rail on the wood, so that the screws for fastening shall not be loosened or disturbed. Sheet 13 shows the truck when arranged with vertical carrying-wheels.

Three different forms of foundation are given in Sheet 1. Figure 1 is a vertical section, and Fig. 6 a horizontal section, of one form. Fig. 2 is a vertical section, and Fig. 7 is a horizontal section, of another form, and Fig. 5 is a perspective of the cap of this second form, which comes above the ground. Fig. 3 is a vertical section, and Fig. 8 a horizontal section, of still another form of setting. Fig. 4 is the cap of this third form.

The post A which is to be set is by preference of substantially rectangular form, and is preferably composed of two channel-bars, *f f*, and two plates, *e e*, riveted or fastened together along the flanges of the channel-bars and the edges of the plates in an ordinary way. This post has provided for it to rest upon at the bottom either a plate, *c*, of somewhat larger area than the post, as shown in Figs. 1 and 3, or a similar plate, *c'*, as shown in Fig. 2, which has an upwardly-presenting boss, which enters into the interior of the post; but any approved form of post may be used, or any approved method of setting, if the truck and track system be used, without departing from the spirit of my invention. I have, however, considered these forms of posts and modes of setting most advantageous. These posts may be used hollow as made, or they may be filled with concrete *b'*, or with sand or other non-compressible filling, as shown in Fig. 2, in the way known and practiced by engineers for many years. These posts are preferably set in and on a concrete foundation. If this foundation is to be upon soft earth, I propose to pack the earth, as shown in Fig. 6, by driving piles all around the place where I am to set the column, as shown, and fill between and over them, if necessary. The piles are marked *a* in Figs. 1 and 6. Where it is not considered necessary to do this, and it will hardly be in well consolidated ground, I simply fill the post-hole with concrete or broken stone below, as shown in Figs. 2 and 7. I may or may not brace the post in any instance at the surface of the ground by

means of the cap *d* or *d'*. (Shown in Figs. 4 and 5.) These caps may be made of cast or of wrought iron. They are in two parts, and are fastened together, as shown in the drawings, by ears which screw up, so as to get a firm bearing against the concrete. If desired, they may be bolted through the post, as shown at *h*, Figs. 3 and 4, or may simply fit upon it, as shown in Fig. 5. As one service of these caps is to guard the post and concrete from the weather and from abrasion and injury by passing vehicles, it is obvious that for this purpose they may be made of wood or other suitable material. Where the ground gives a good foundation, but the surface-soil is mobile, as in the Mississippi valley and elsewhere, side thrusts are not well resisted, and in such cases I line the inside of the post-hole with a stout resistant boxing or lining of iron or wood, as shown at *g*, Figs. 3 and 8, and fill this with concrete or sand inclosed between concrete ends, and thus form a firm and strong side support to the post, practically increasing its section below the ground many times. The posts illustrated in these drawings are supposed to be about eleven inches by ten in transverse area, and to be set in the ground deep enough to secure stability with at least a foot of concrete beneath them. Such posts at a distance of forty-five feet apart will be amply sufficient to carry a girder capable of supporting substantially such trains as are now in general use at a height of at least fourteen feet from the ground to the bottom of the girder. The posts are supposed to be made of about one-half-inch iron, and greater strength can be given to them, of course, by increasing the quantity of iron, and, if necessary, the horizontal area of the posts, or by internal bracing.

Sheet 2 illustrates the girder. Fig. 9 shows its adjustment upon the posts. Fig. 10 shows the bearing-brackets to be used beneath it. Fig. 11 is a side elevation of a post and portions of the girder. Fig. 12 is an illustration of the upper boom of the girder, showing its rails. Fig. 13 is a perspective of the diagonal braces of the girder.

Sheets 11 and 12 relate to modifications of the girder for electric motive power already referred to. Fig. 47 shows the adjustment of the girder on the posts. Fig. 50 is a duplicate of Fig. 10. Fig. 48 is a modification of the details of Fig. 11. Fig. 49 shows an I-shaped brace instead of the channel form of Fig. 13. Fig. 14 is a plan which shows upon the right side the girder looking down upon the upper boom, and upon the left side the lower boom of the girder, the upper boom being removed. Fig. 15 is an expansion-joint which connects the booms of the girders with the posts. Fig. 51, Sheet 11, is a plan looking down on the top of the upper boom of the modified form, and Fig. 52 is a plan illustrating the lower boom with the upper boom and braces removed.

In Sheet 12, Fig. 53 is a perspective showing how the rails of the upper boom are insulated, an expansion splice provided, and a continuous electrical conductor maintained. Fig. 54 illustrates the construction for an electrical road of the stringers and rails of the lower boom. Figs. 55, 56, 58, and 59 show how the expansion slots may be made, and the bolt-heads sealed up in them secure from rattling out. Fig. 57 shows an insulated conducting-plate at the splice of the rails in section. Fig. 61 is another form of the same without a slip-joint; and Fig. 60 shows a partly-sealed bolt-head in an expansion slot. At the proper height for resting the lower boom of the girder the bracket angle-irons *i* are bolted onto each post, and on these irons the lower portion of the girder rests. The upper boom of the girder rests upon the extreme top of the post, and through the diagonal braces supports the road carried on the lower boom of the girder. The girder is composed of a lower box-boom, C, an upper box-boom, B, and of diagonal braces D between them, Sheet 2, or D', Sheet 11. The lower box-boom is composed, as shown in Fig. 9, of the two plates K K and two channel-bars, *l l*, firmly riveted together. It is intended to embed in the exterior recess of the channel-bars wooden beams *m m*, which may be single sticks, as in Sheet 2, or composite beams made up of several pieces, as in Sheet 11. These wooden beams act as rail-stringers. In order to bring the entire strength of the iron into play these beams *m* are riveted on crosswise of the girder at intervals of about two feet, the T-brackets *n* composed, as shown in Figs. 10 and 50, of two angle-irons, back to back, or, if desired, of a rolled T-iron.

In the angle formed by the upper plate, K, of the box, beam, or boom C, with the channel-bars *l* on its outside, angle-irons *o* are also bolted. These angle-irons may be made a good deal deeper than shown, so as to considerably stiffen the girder and serve as attachments for the braces D, or attachment-plates *p* for the braces D may be inserted at proper intervals and riveted to the angle-irons *o* and to the braces D, and these attachment-plates may be of any proper form, as the rectangle of Fig. 11, or the trapezoid of Fig. 48. These braces D are made, as shown in Fig. 13, of two angle-irons and a plate, or as channel-bars, or as I-beams D', Figs. 48, 49. They are also attached to the upper boom of the girder by the attachment-plates *p'*. The upper boom, B, of the girder is also a box-boom composed of two channel-bars, *l' l'*, and two exterior angle-irons, K' K', and this may be re-enforced by angle-irons *r r*, all well riveted together; and it carries in the recess formed by the exterior angle-irons the stringer-beams *m' m'* for supporting the rails, as described. Of course these beams *m* and *m'* may be made of solid or compound sticks of timber, on which the rail angle-irons or flat plate-irons may be fastened, or if the work is light they may be used without rail-iron. These booms may be braced

or not, as the posts are close or farther apart. An expansion-joint may be formed at the end of these upper booms, as shown in Fig. 15, in which D is the brace, p' the plate which connects the brace to the said upper box-boom. S is a bracket firmly riveted to the post, and having slots of sufficient length to allow for the ordinary expansion, through which the bolts pass connecting the plate p' and bracket S, so as to guide the slip. The lower surface of the upper box-boom, as before described, rests upon a terminal plate at the top of the post, which thus takes its weight, so that these brackets in the slip-joint serve only as guides. Fig. 12 is a variation of this upper box-boom, made up of the lower plate, g', of the two lateral channel-bars of unequal flanges K^2 K^2, and of a top plate, l^2. The rails of this structure are four in number. The two bearing-rails which carry the load of the car are angle-irons placed upon the outer upper edge of the stringers m. They are marked t in the drawings, and they are fastened, as shown, through from side to side to each other, to the stringer-beams, and to the lower booms of the girder by through-all bolts u, or may be fastened, when electricity is to be used, simply to the wooden stringers, as hereinafter described. The upper boom also carries two vertical rails for the balancing or friction wheels, lettered t^2 t^2, and are similarly held to the stringers and boom by the through-all bolts u^2; but when electricity is used as a motor these through-all bolts may fasten the wooden stringers together and be insulated from the rail, which may be fastened directly to the wooden stringer, or may be further insulated, if deemed necessary. These upper rails, it will be seen, project over the line of posts and braces, or have a small recess beneath them, under which the flanges of the horizontal wheels run to securely lock the truck upon the track. The horizontal distance from the outside to the outside between the lower rails is intended to be about twenty-two inches, and the upper rails about eighteen inches for trains of the ordinary weights, and the depth of the girder would be about four feet.

Sheet 3 shows a plan of the switch. Fig. 16 is a sketch plan of the switch, in which F is the main way. F′ and F^2 are the branches with which the main way is to be alternately connected. The switch is a girder hinged at H, which runs on a track, J′, extending transversely between the branch tracks F′ F^2. It is swung from one to another by means of rag-chains and sprocket-wheels, or in any other suitable way, and locked in position by a locking device. The details of the construction of this switch may be seen in Sheets 4 and 5, in which Fig. 17 is a side elevation of the hinge end of the swinging girder, and Fig. 17^a a side elevation of the locking end of the swinging girder. Fig. 18 illustrates the connection of the rag-chain with the end of the girder and its carriage. Fig. 19 is a plan showing on the left-hand side the hinged end and on the right-hand side the locking end in plan, and Fig. 20 is an end elevation of the post and swinging girder, showing the method of locking and unlocking and one of the rag-chains and sprocket-wheels for moving the switch. Fig. 21 is a longitudinal section of the locking end. Fig. 22 is an enlarged view of the pivot or hinge of the girder in longitudinal vertical section. Fig. 23 is an end elevation of the post and swinging girder at its locking end. Fig. 24 is a plan of the top of the hinge end. Fig. 25 is a vertical section of the hinge end on a plane transverse to that shown in Fig. 22. The hinge is strongly bracketed out from the post at the end of the main way F, as shown in Fig. 17, and consists of a series of iron plates arranged concentrically around the pivot-pin h^4. One half of these plates are attached to the swinging girder and one half to the post. One half are made with a convex end, and one half with a concave end, as shown in Fig. 17. The convex-ended plates are larger than those with concave ends. The series on the girder is composed of alternate layers of concave-ended and convex-ended plates and the series on the post of alternate layers of convex-ended and concave-ended plates, and when put together the convex end of a plate on the girder or post fits against the concave end of a plate on the post or girder. This hinge is, therefore, composed of a pair of counterpart members, each consisting of a pile of plates alternately long and short in one member and short and long in the other. The ends of the long plates are cut on the salient arc of a circle concentric with the hole for the pintle h^4, and are thus convex, and the ends of the short plates are cut on the re-entering arc of a similar circle, and are thus concave. They are not, however, dished in any degree, but are convex and concave cylindrically and not spherically. Each convex-ended plate is pierced at its center, and a stout pintle, h^4, passes through all the holes, and thus forms a strong hinge. (Shown in longitudinal vertical section in Fig. 22 and in transverse vertical section at Fig. 25.) The girder swings around this hinge, firmly supported upon it, so as to make a small angle at the point H. (Shown in Fig. 16, Plate 3.) Each end of the switch-girder is provided with a vertical piece, h^5, to serve as its terminal vertical brace. At the locking end of the swinging girder the branch tracks of course terminate on posts, and between these posts is mounted on strong brackets an ordinary deck-beam, as shown in Fig. 21 at v and in Fig. 19 in plan. The girder rests upon a carriage, which is provided with a long roller at each end, so that the movement in arc of the end of the girder may be accommodated upon the chord of the arc made by the rail v. In order to move this girder, a hand-wheel is mounted upon one of the posts, as shown in Fig. 20 at d', which carries upon its shaft a sprocket-wheel, d^2, driving a rag-

chain, d^3, which engages with another sprocket-wheel, d^4, all as shown in Fig. 20. This sprocket-wheel d^4 carries upon its shaft a cam, d^5, which operates upon the end of a bent lever, d^6, and serves to drive the cam-bolt d^7, which withdraws the locking-latch. By reference to Fig. 17ª it will be seen that this latch is provided with a wedge-cam, d^8, at each end, which wedge-cam enters a loop of a spring-latch, d^9, and withdraws it from engagement with the girder. This detail is seen more readily in Fig. 21. The sprocket-wheel d^4 carries upon its axis another sprocket-wheel, which drives another rag-chain, d^{10}, which second rag-chain, d^{10}, engages with the switch-girder H by means of a slotted link, d^{11}, the lost motion of which slotted link in reversing the gear is sufficient to allow the latch to be withdrawn before any strain is brought to bear to move the girder. This detail will be better understood from Fig. 23. An automatic method of operating the switch by a moving train will form the subject of an independent patent. The construction of the hinge will also be very readily understood from Fig. 22 of the drawings.

Sheet 6 shows the manner of constructing a wooden Howe truss with the bearing-rails on the lower boom and the balancing-rails on the upper boom, and which may be set on wooden posts of any shape. The details of this construction will readily be understood from the drawings, Figs. 26, 27, 28, 29, 30, and 31, without letters of reference. By increasing the number of posts it will readily be seen that the bracing or trussing between the two booms of the girder may be dispensed with.

By reference to Sheets 11 and 12 the modification requisite to enable the rails to be used as insulated electric conductors will be understood. The rail-stringers $m\ m'$ on the outer edges of the upper and lower beams should be "built" on composite beams, those sections next the girder fastened to it by the through-all bolts, and the exterior sections fastened to the interior sections by bolts or screws. This would give a wooden or other proper insulation, and will be understood from Fig. 52, Sheet 11, where m represents the stringer, u the through-all bolts, t^3 the insulating-section, which may be of wood, rubber, gutta-percha, or other proper material, and t^4 the splice-plate for securing metallic connection in the rail-joints.

As it will be necessary to make slip-joint connections between the rails and the splice-plates, the details of such connections are shown on Sheet 12, in which Fig. 53 represents a stringer and rail-joint of the upper boom, and Fig. 54 a stringer and rail-joint of the lower boom. The splice-plate t^4 is bedded in the stringer and bolted to it, and the rails $t\ t^2$ are bolted to the splice-plate through slotted sealed holes. Figs. 55, 56, 57, 58, 59, 60, and 61 show how this is done. This construction locks the fastenings down. An under cut is made in the rail longitudinally by a chisel in two directions, as shown, Fig. 55, and the iron flanged upward. A hole is next drilled in the rail and enlarged to a slot by a traveling reamer, as seen in Figs. 56 and 58. When the rail is laid, a screw is driven through this slot into the splice-plate t^4, as shown in Fig. 57, and the flanges turned down again, as shown in section, Fig. 57, and in plan, Figs. 59 and 60, one flanged and turned at the sides. The other is cut under at the end. Provided the screw through the splice-plate does not touch the metal of the girder, it may be driven into the timber, as shown, Fig. 61, without breaking the insulation.

In order to use this first part of the invention, the way, in the construction of a permanent way for a railroad—namely, a girder having two bearing-rails, one on each side of the lower boom of the girder, and two balancing or friction rails, one on each side of the upper boom of the girder—and to employ this girder so constructed suitably, I have a peculiar form of truck, the details of which and its relation to the girder are shown in Sheets 7, 8, 9, 10, and 13 of the drawings. Fig. 32 is an end elevation, and Fig. 33 is a side elevation, of this contrivance as adjusted for use. Fig. 34 is a top plan, and Fig. 35 is a section.

An iron frame is made, as shown in section in Fig. 35, which consists of a platform-frame, 1, carrying on its upper surface what is in substance the lower member of a fifth-wheel, 2, Fig. 34, which engages with the carriage part of the fifth-wheel 3, Fig. 34, on which the carriage is arranged, and these two members of the fifth-wheel connect by an overhanging guide, so that the carriage is locked to the truck as well as the truck to the track. This platform has two vertical flanges, 4, which come down on each side of the girder, and are provided with diagonal braces 5 on the outside. These diagonal braces are at the two ends of the truck-platform 1, as shown in Fig. 33, and are provided with bosses 6, which run through to the vertical flanges and carry the axles of the inclined bearing-wheels. The particular mechanical details of this construction are reserved for an application for another patent. The bearing or carrying wheels which I prefer are inclined, but may be vertical, and are marked 7, and their edges are shaped to fit the angle of the bearing-rails t on the lower boom of the girder upon which they roll. The wheels are independent of each other.

Instead of the wheel being inclined and on the outside of the brace 5, it may be vertical and on the inside of flange 4, and the axle and axle-boss would then be horizontal and the wheel of ordinary form, with its flange outside, as shown in Sheet 13, Fig. 61ª; but I prefer inclined wheels, as more stable and resisting strains better. Intermediate between these carrying-wheels 7 are placed horizontally, close to the truck-platform, the friction-wheels 8. (Shown in Figs. 32, 33, 34, and 35,

and in Sheet 13.) These friction-wheels are shaped much like an ordinary car-wheel, and have their flanged sides downward; or they may be double-flanged, for the purpose of locking down the truck to the girder. Their axes are vertical, and are placed, as shown in Figs. 34 and 35, in sliding boxes, so that they may be brought to bear against the vertical tracks of the upper boom of the girder with great force, either by pressure of springs, as shown at the right hand of Fig. 35, or by hydraulic or other positive pressure. These horizontal wheels 8 are used to balance the car against side strains from centrifugal force, wind, and the like, and are also employed as brake and driving wheels of the train, the sliding boxes being simultaneously moved inward and outward, as desired for either purpose, either by the system of spring-pressure to throw the friction on and positive pressure to take it off, or by the system of positive pressure to throw the friction on and springs to relieve it. When used as brakes, spring-pressure to throw the friction on is the best, and for draft purposes a regulatable pressure to throw the friction on or off is preferable. These springs also give elasticity to the side wheels. The motive power may be applied to the axles of these wheels in any ordinary and known manner—as, for instance, by a crank on the axle carried up to the platform, and connected with an engine mounted upon the platform, or by a dynamo-machine, as shown in Sheet 13, Fig. 63, connected with the axle, or by any ordinary form of motor or motive power.

Fig. 61ª is an end elevation, and Figs. 62 and 63 detail views, of the truck and motor.

Sheet 9 shows, in Fig. 36, a method of building the wheels in sections, of wood or paper, with metallic faces and a metallic tire bolted on. Fig. 37 shows the box and journal of the wheels and how the journal is applied to the projection from the truck-platform, which method of applying is shown in plan at Fig. 40. Fig. 39 is a side elevation of the interior construction of a sectional plate forming a part of a wooden wheel. Fig. 38 shows in front elevation the wheel journal or axle area and its attachment to the diagonal brace 5, already referred to, and Fig. 41 is a top view of the same attachment. Fig. 42 is a cross-section of the journal and its box at *o x*, Fig. 37. Fig. 43 shows the journal sliding box and spring of the horizontal wheels when used for brake-wheels, and to provide for yielding at variations of the way. Fig. 44 is a detail of the lower surface of the hub end of one of these horizontal wheels taken at *x x*, Fig. 43, showing balls arranged in grooves to ease the friction, and Figs. 44ª and 44ᵇ are details of the same. Fig. 45 is a horizontal section of the sliding box and its spring. Fig. 46 is a side elevation of the wheel.

The details of the construction of this apparatus will form the subject of applications for future patents.

The advantage of using the horizontal wheels for brake and draft is that the power is thus brought close to the load.

In using track-conveyed electricity as a motive power, slack cables may be used to carry the current round the slip-joints from girder to girder or at broken points.

Of course this invention would be practiced if the carrying-rails were bracketed on the outside of the girder between the booms, the object being to get a low point of support with a high-placed abutment for draft and brake power.

What I claim now as my invention, and desire to secure by Letters Patent of the United States, is—

1. In a post-supported railway, a girder carrying four tracks at two different levels, the two which support the carrying-wheels at or near the upper horizontal and outer vertical surfaces of the lower boom, and two which take the bearing and grip of the driving-brake and balancing-wheels at or near the vertical outer surface of the upper boom, substantially as and for the purposes described.

2. A truck for a post-supported railway provided with two sets of wheels, each set severally at different levels and revolving in different planes—viz., carrying-wheels which support the load at the low level and friction-wheels at the high level—whereby the load rests on a low plane of support, and draft or brake power is applied horizontally on a higher plane and nearer the load to sustain, balance, and move the carriage, substantially as described.

3. A post-supported railway and railway track having the combination of lower rails which carry the load, bearing-wheels which roll upon said lower rails, upper vertical rails for the application of draft and braking power and to receive side thrusts, horizontal wheels to bear against said upper rails, and a truck which straddles the frame-girder and carries such wheels and also supports the body of the carriage upon its upper platform, substantially as described.

4. The combination of the horizontal wheels having a peripheral flange at their lower side with the vertical rails of the upper boom of the girder made to project over said flange, substantially as and for the purposes described.

5. The combination of a straddling truck, inclined carrying-wheels, and a girder carrying outside bearing-rails low down on the girder, substantially as described.

JOE V. MEIGS.

Witnesses:
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FRED. B. DOLAN.