

No. 825,834.

PATENTED JULY 10, 1906.

J. C. HINTON.

MEANS FOR CONTROLLING THE SPREAD OF WHEELS OF RAILWAY  
OR TRAMWAY VEHICLES.

APPLICATION FILED SEPT. 26, 1904.

4 SHEETS—SHEET 1.

Fig 1.

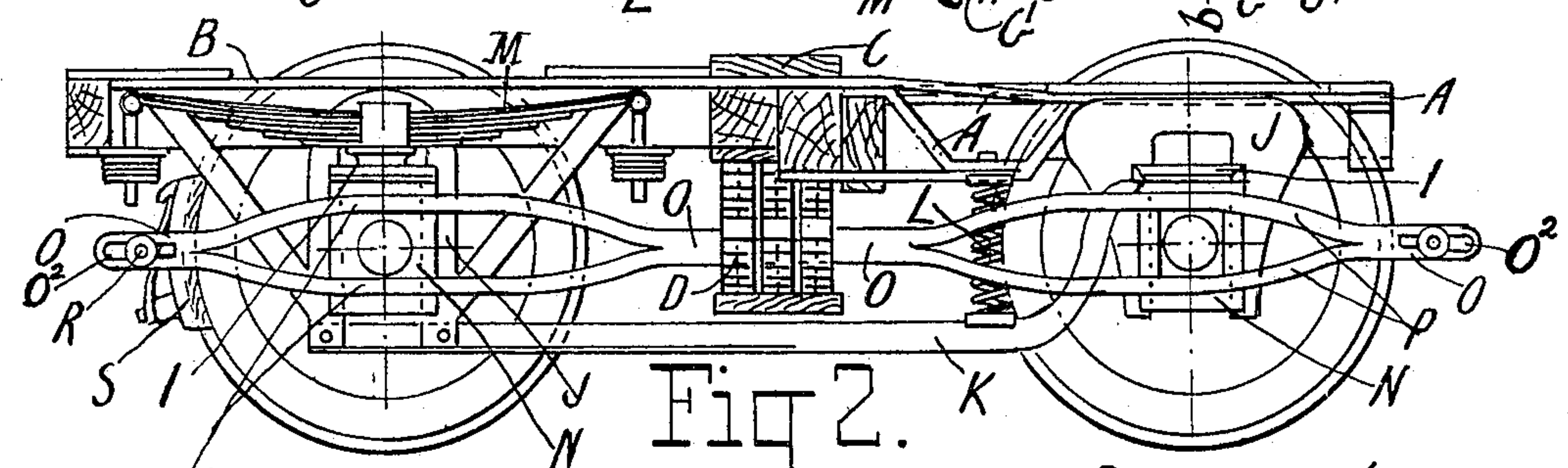
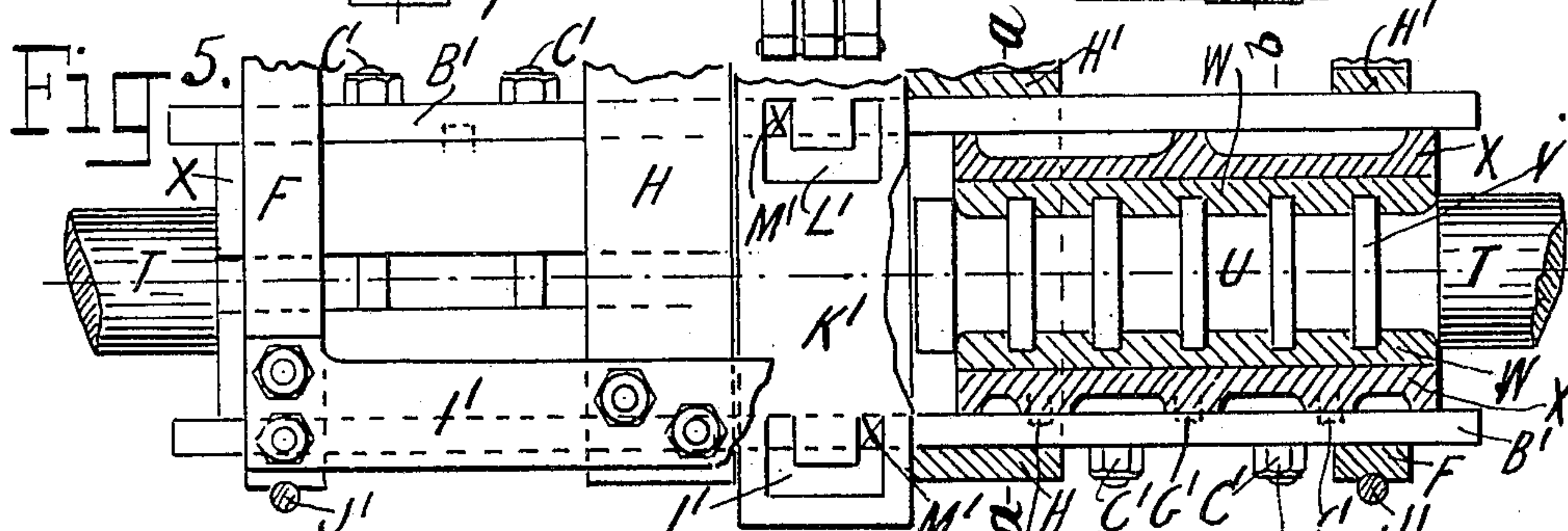
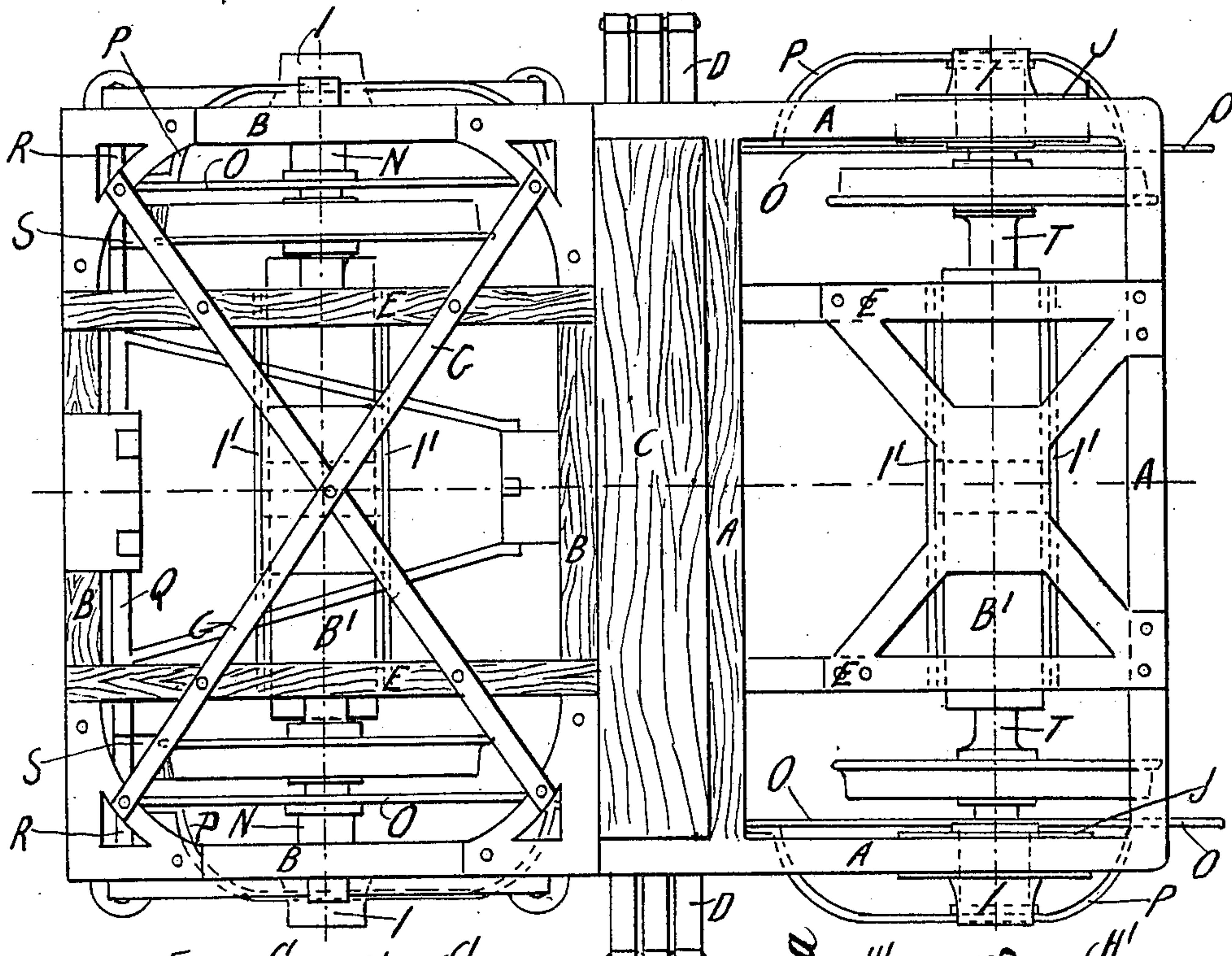


Fig 2.

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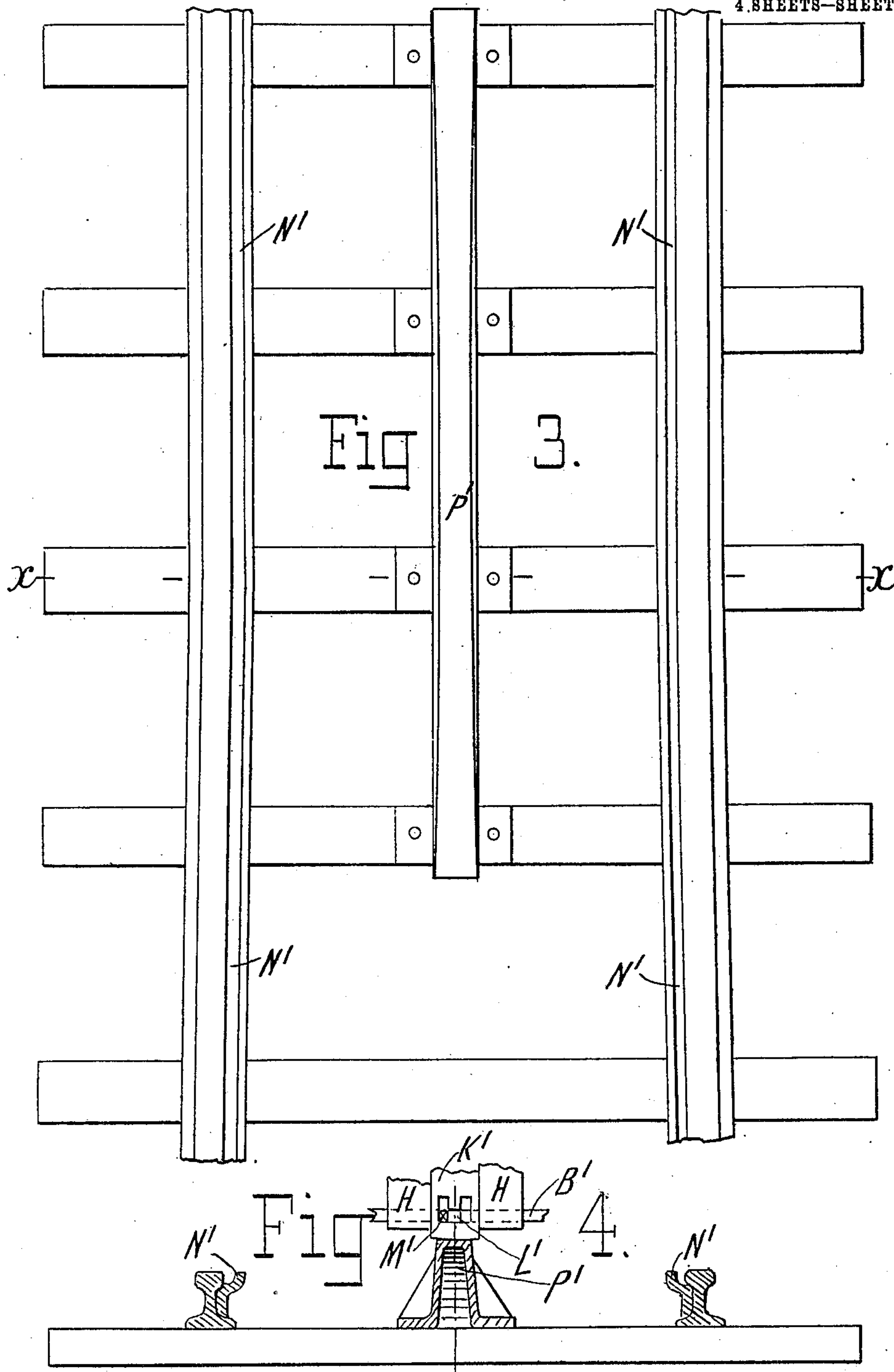
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4 SHEETS—SHEET 2.



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4 SHEETS—SHEET 3.

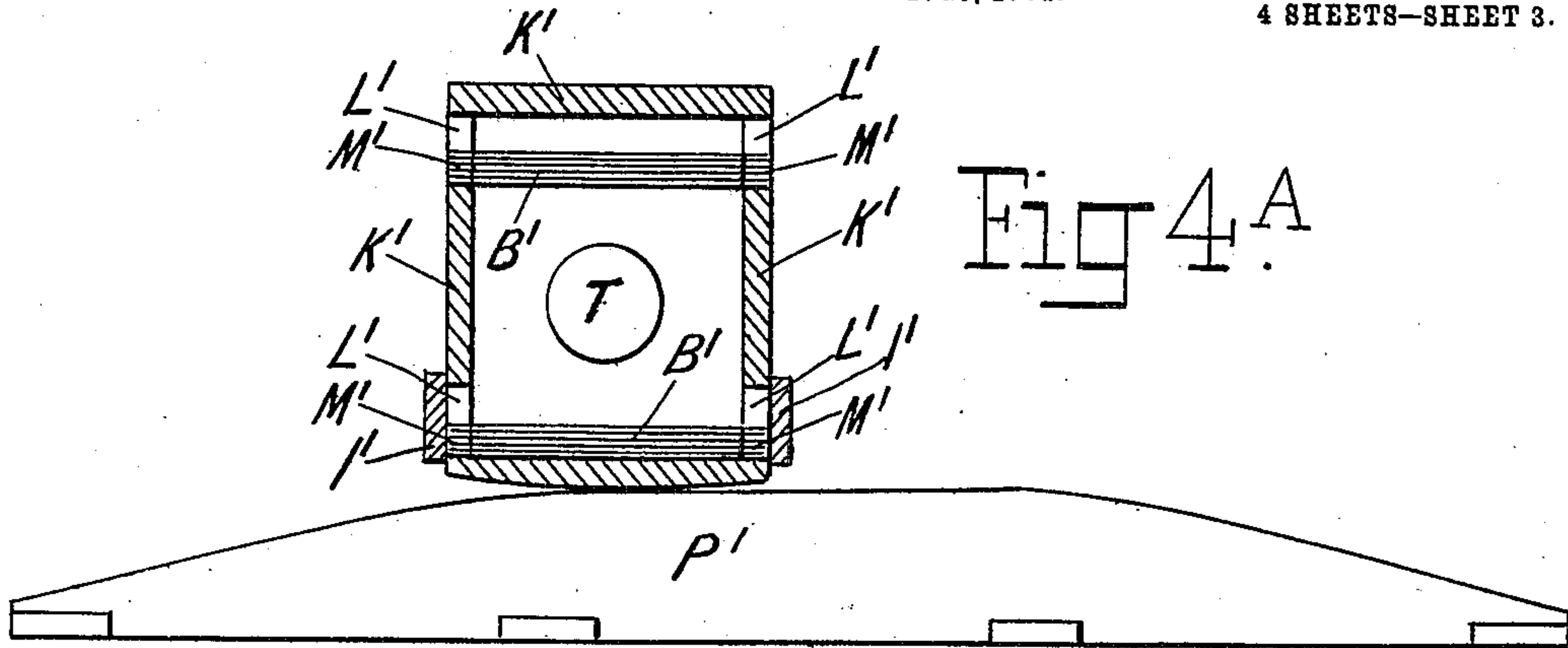


Fig 4A.

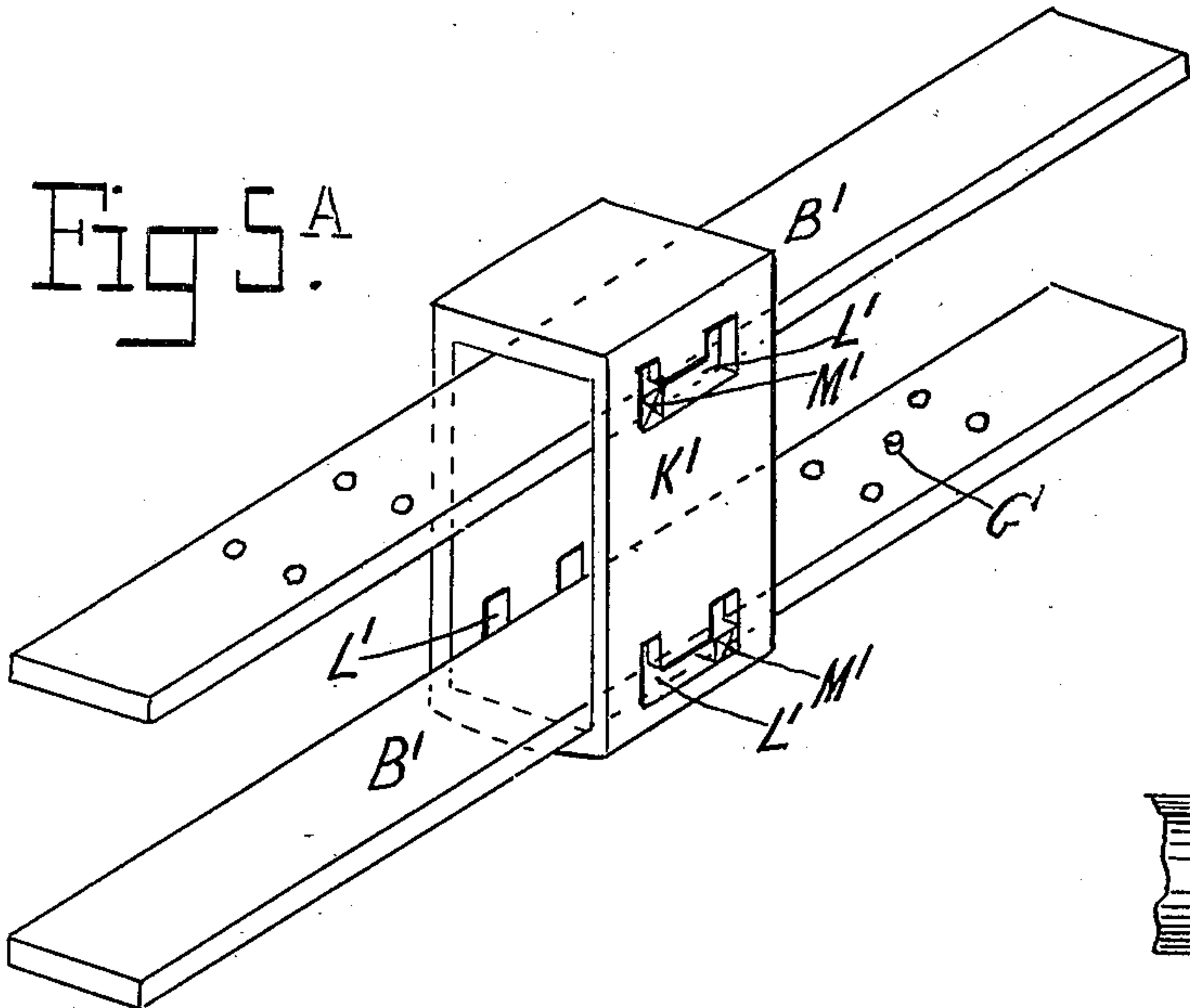


Fig 5A.

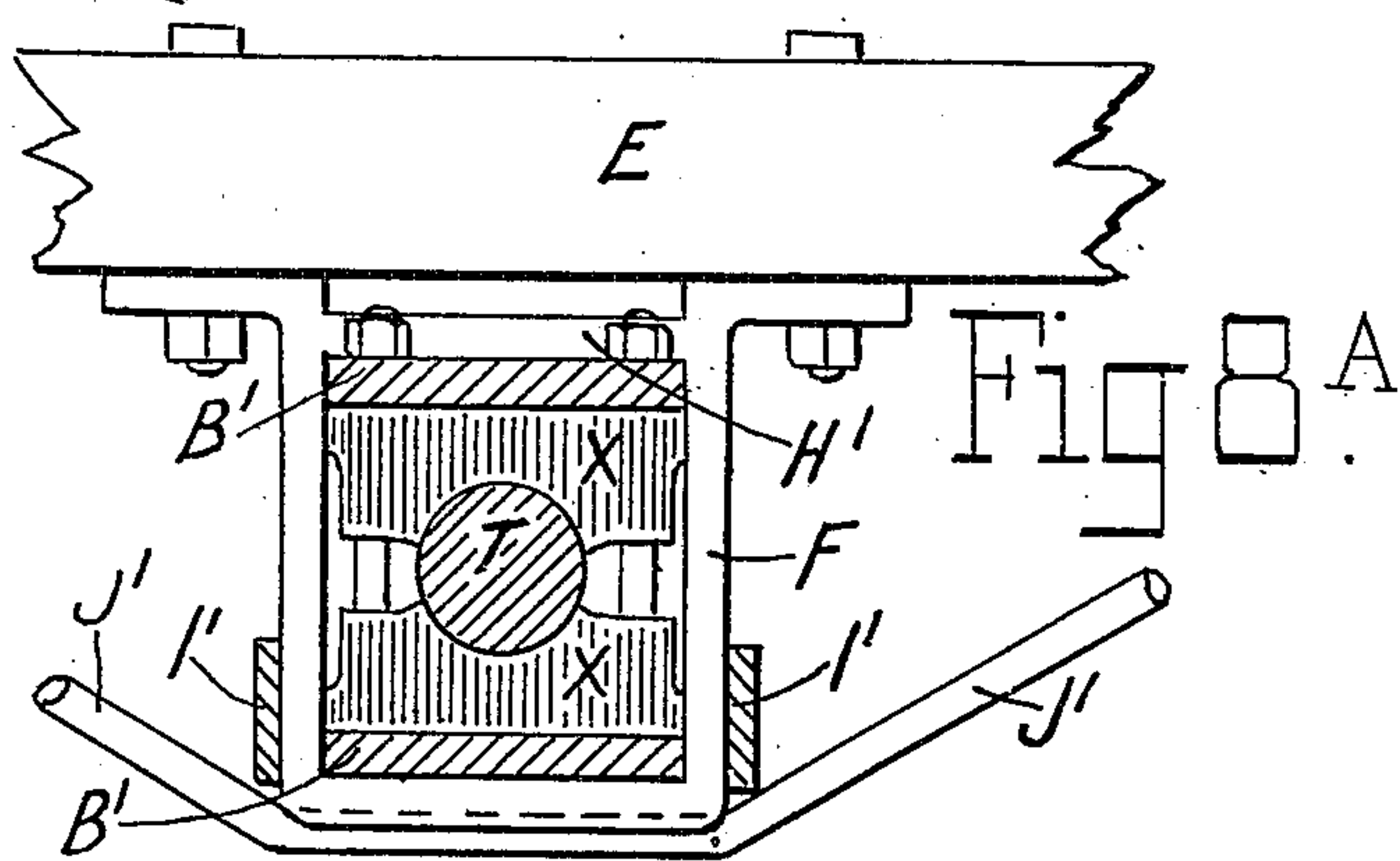


Fig 8A.

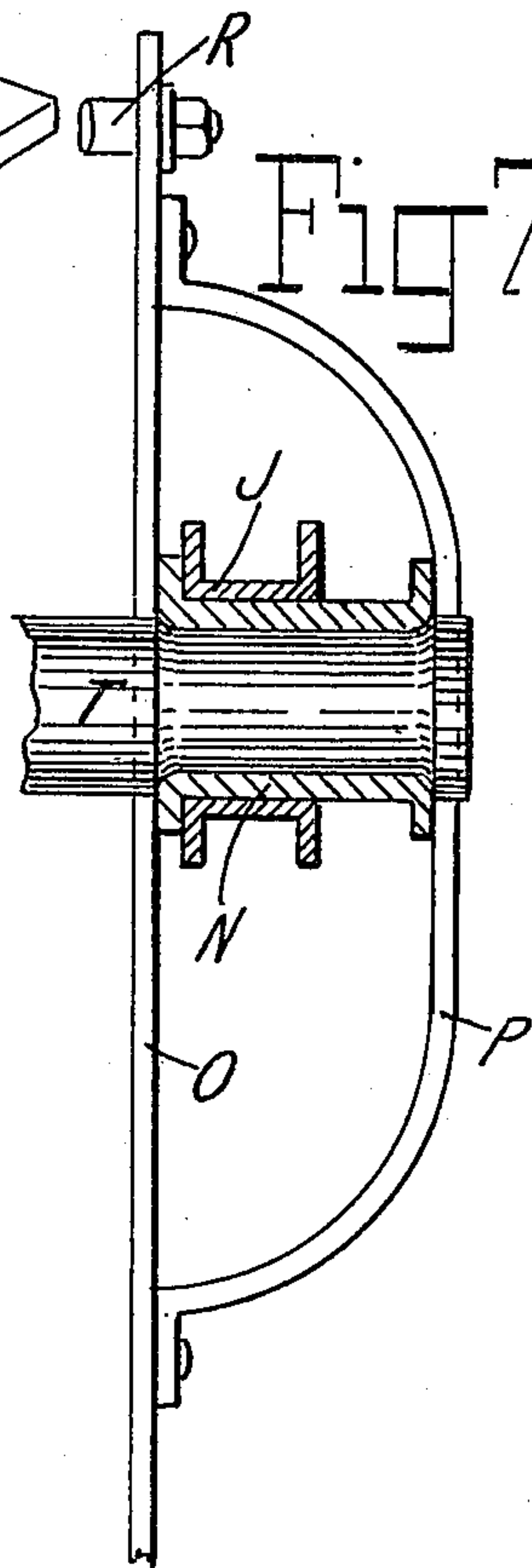


Fig 7A.

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Fig 6.

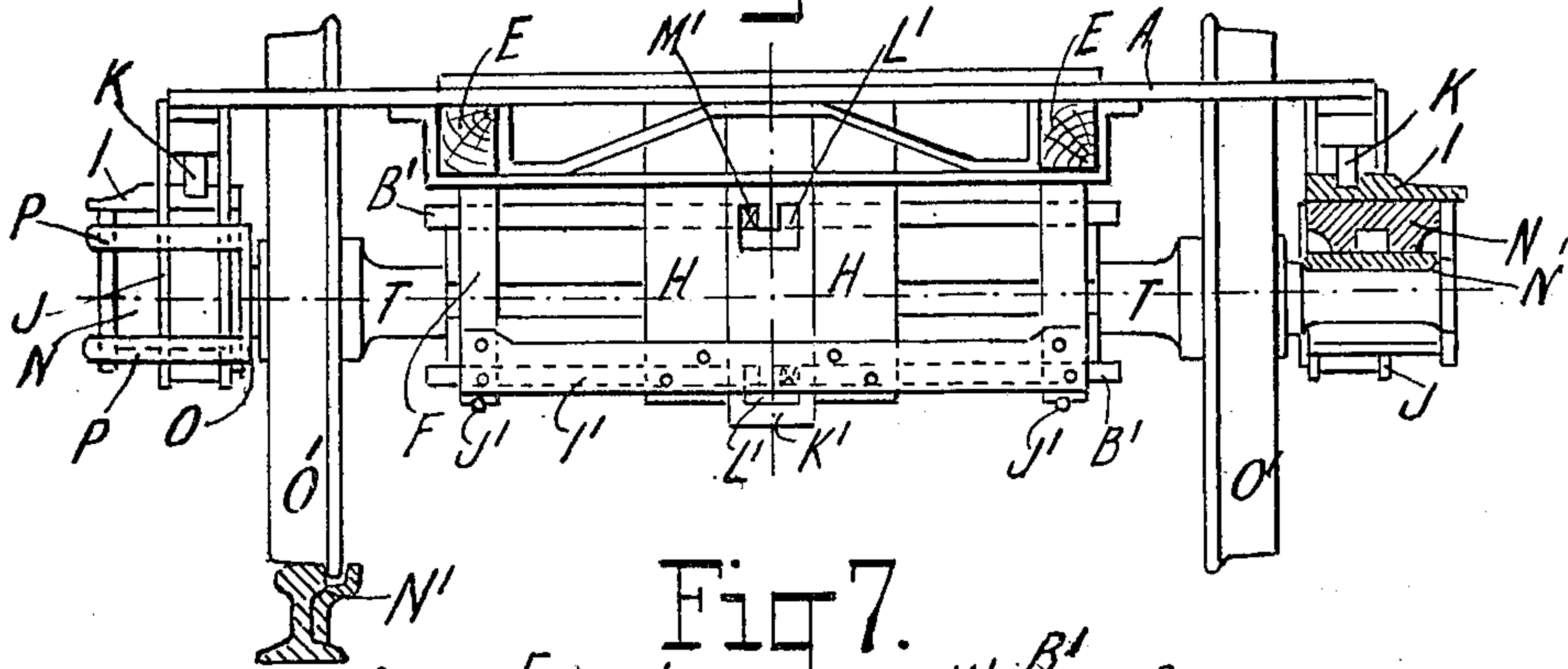


Fig 7.

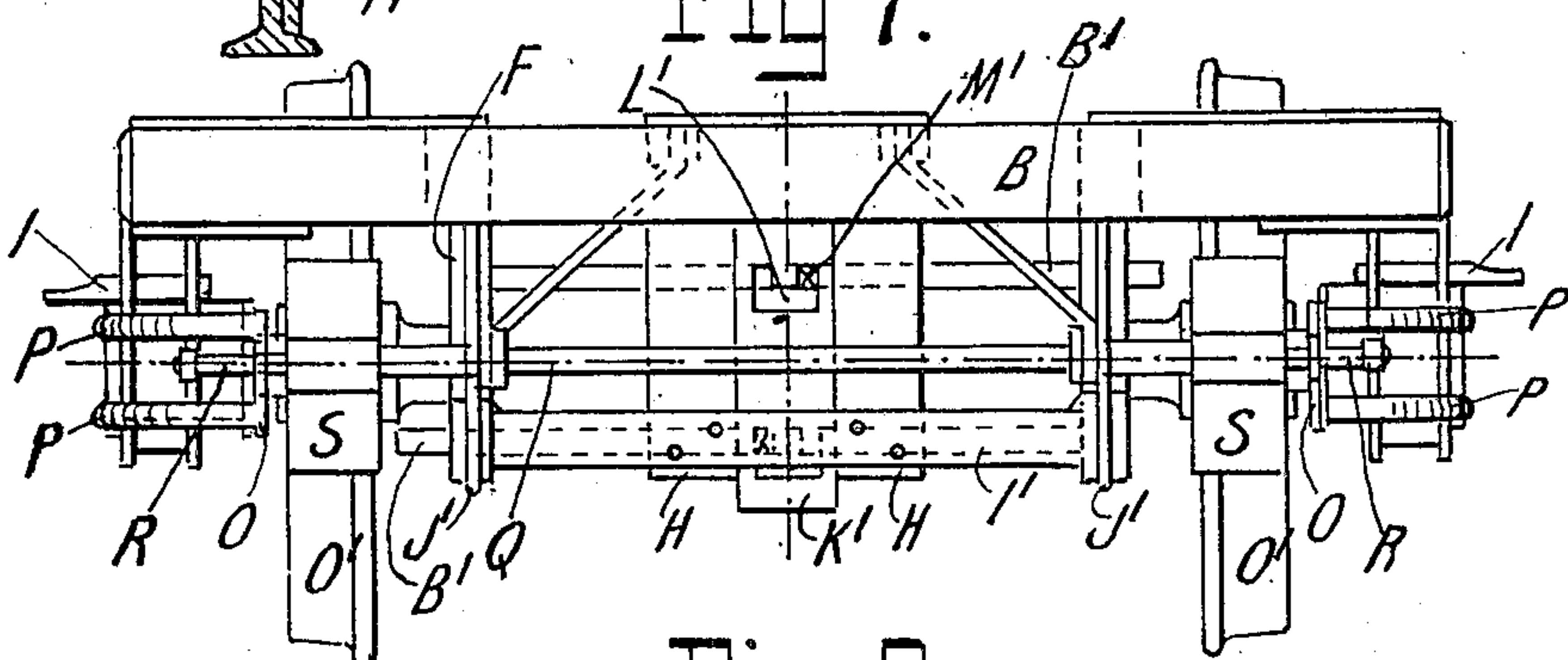


Fig 8.

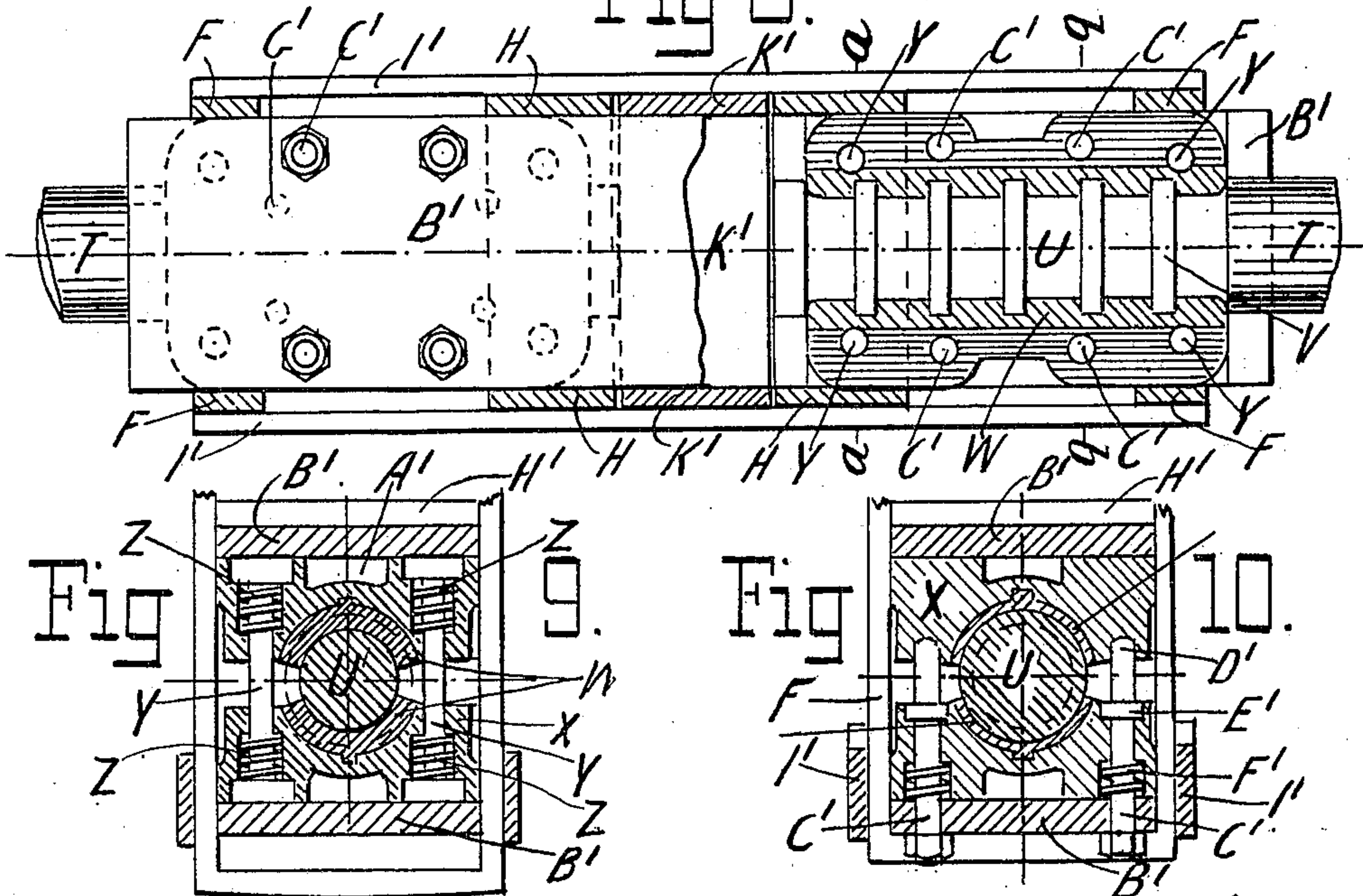


Fig 9.

Fig 10.

Witnesses.  
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*James C. Babcock*

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# UNITED STATES PATENT OFFICE.

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MEANS FOR CONTROLLING THE SPREAD OF WHEELS OF RAILWAY OR TRAMWAY VEHICLES.

No. 825,834.

Specification of Letters Patent.

Patented July 10, 1906.

Application filed September 20, 1904. Serial No. 226,046.

*To all whom it may concern:*

Be it known that I, JAMES CHARLES HINTON, railway-car builder, a citizen of the Commonwealth of Australia, residing at Wickham street, Arncliffe, in the State of New South Wales, Commonwealth of Australia, have invented certain new and useful Improvements in Means for Controlling the Spread of Wheels of Railway or Tramway Vehicles; 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 appertains to make and use the same.

This invention relates to railway rolling-stock having the individual wheels of each pair of wheels on a separate axle extending to the middle of the car, each wheel and its axle being adjustable laterally of the truck to vary the spread of the wheels, thereby adapting the cars and other rolling-stock to railways of different gages.

The chief object of this invention is to provide satisfactory means for automatically and reliably adjusting the wheels outward and inward and to lock them in either position; also, to improve the construction of the axle-boxes and proximate parts and the general operation of the mechanism.

To these ends the said invention consists in the construction and combination of parts hereinafter more particularly set forth and claimed.

In the accompanying drawings, Figure 1 represents a plan view of a truck or bogie frame embodying my invention, illustrating in its right and left halves, respectively, two different forms, commonly known as the "old" form and the "new" form of frame. Fig. 2 represents a side elevation of Fig. 1. Fig. 3 represents a plan view of the track, having a fixed cam-plate between the rails of greatest height at the center and tapering down to its ends for operating the wheel shifting and locking devices. Fig. 4 represents a transverse vertical section of Fig. 3 on the line  $x x$ . Fig. 4<sup>a</sup> represents an enlarged detail view at right angles to Fig. 4, showing the cam-plate in elevation and the box-form locking-piece in vertical section. Fig. 5 represents an enlarged detail view, partly in front elevation, partly in vertical transverse section, of the slotted locking-

plate, the inner ends of one pair of axles, and certain proximate devices. Fig. 5<sup>a</sup> represents an enlarged detail perspective view of the locking-piece and slide plates. Fig. 6 represents an end elevation of the bogie-frame, (old form for both sides,) showing a pair of wheels, their axles and appurtenances slightly modified, one of the track-rails and a part of one of the axle-boxes being sectioned and the wheels shown in their greatest spread for the widest gage of track, a modified arrangement of the surface-plates and the ends of the lower bars being shown. Fig. 7 represents a similar view showing the new form of bogie, the wheels being at their least spread for a narrow-gage track, no rail being shown and no part sectioned. Fig. 7<sup>a</sup> represents an enlarged detail view of one of the outer axle-boxes and proximate devices, slightly modified, partly in elevation, partly in vertical section longitudinal of said box. Fig. 8 represents a bottom plan view, partly in central horizontal section, of the devices shown in Fig. 5. Fig. 8<sup>a</sup> represents an enlarged detail side elevation of one of the hangers F and proximate devices, the axle and slide-plates within said hanger being cross sectioned. Fig. 9 represents a transverse section of Figs. 5 and 8 on the line  $a a$ . Fig. 10 represents a similar view to Fig. 9 on the line  $b b$  of Figs. 5 and 8.

A represents the rectangular frame of the old form of bogie, B the frame of the new type, and C the bolster-bed, which is alike in both and supported, as usual, on springs D. The frame is provided with longitudinal inner bars or bearers E, arranged in pairs parallel to the sides of the frame and rigid therewith. Bracing-bars G are also fastened to said frame, preferably in the form of a St. Andrew's cross, though differing in details, according to the kind of bogie-frame employed. The outer and inner hangers F and H of each inner axle-box X are attached to one of the said bearers and to the corresponding bracing-bars, respectively, extending down and around the said box at its outer end and inner end, but permitting the outward and inward movement of said boxes with their axles and wheels in adjusting the spread of the latter to the tracks of different gages.

As shown in Figs. 5 and 8, each inner axle-



box X has fixed to it an internal brass bushing W, annularly grooved internally to receive the collars V of the inner journal U of the short axle-journal T, the terminal thrust-collar of said journal being just beyond the said bushing toward or near the middle of the bogie-frame and overlapping the proximate inner end of the said bushing. Guide-bars B' extend across the frame in line with the said boxes and axles and within the said hangers, permitting the said boxes to move freely along them in adjustment for spread of wheels while held in their proper places. Though the brass or bushing W permits the journal to turn within it, the thrust-collar and the collars V, fitting into grooves of said bushing, as aforesaid, insure the movement of the parts inward and outward as one when the wheels are thus adjusted.

The usual downwardly-arched lower bar K extends from the housing of one outer axle-box to the other on each side of the bogie-frame, affording a support (if the old form of frame be used) for spring L, on which rests the frame A, the ends of said lower bars being held in place by upper plates I, fastened in said housings, as illustrated on the right side of Fig. 2, although the relative position of these surface-plates and ends of lower bars may be reversed, if preferred, as shown in Fig. 6. If the new form of bogie-frame be used, the same plate I, as shown in the left part of Fig. 2, affords a base over each axle-box for a frame-supporting spring M in immediate contact with frame B.

Longitudinal inner bars O, as shown in Fig. 2, extend along the sides of the frame beyond the wheels, each of these bars dividing, in proximity to each outer axle-box, into two diverging and outwardly-bowed bent bracing-bars P, uniting at each end in the said bar O and receiving one of the outer axle-bars between their diverging middle parts to brace it above and below, moving inwardly and outwardly therewith. The corresponding ends of these bars O are longitudinally slotted to receive the protruding ends R of the brake-spindles Q. Brake-blocks S are attached at their outer sides to the said bars and carried by said spindles, as shown in Fig. 7, and move in and out with bars O along the said spindles. The slots O<sup>2</sup> prevent binding during such movement and allow for contraction and expansion under changes of temperature. The ends R of spindles Q protrude far enough to permit the aforesaid adjustment of the said bars for change of spread of the wheels and are provided with heads which prevent the ends of said bars from slipping off the said spindles. As shown in Figs. 6 and 7, the bars P need not incline upward in diverging, but may be in parallel longitudinal planes throughout, their ends being integral with vertical parts of bars O, in these instances made wider for that purpose, or, as

in Fig. 7<sup>a</sup>, the said bars may be bolted to said bars O instead of being integral therewith. Only one bar P appears in this figure.

The inner axle-boxes X and their bushings W are divided longitudinally into two sections, Figs. 9 and 10, said sections being held together by bolts Y, Fig. 9, and pressed toward each other by helical springs Z, which surround said bolts, bearing upward and downward, respectively, against the head and nut of said bolt and operating to force the sections of the axle-box toward each other and hold the sections of bushing against the journal U between them, taking up the wear of said bushings without impeding the turning of the axle. Plates B' are located above and below the said axle-box sections and connected to them, respectively, by bolts C', arranged in pairs and shown most distinctly in Fig. 10, each of said bolts passing through its plate B' and the contiguous section of the axle-box and being provided with a stop-collar E', which sets into a recess in the inner face of said section. Its upper end D' enters the opposing section and serves as a guide therefor. Springs F' surround said bolts C' and fit into recesses of said box, bearing outwardly against the plate B' and inwardly against the box-section. These springs will take up any wear of the bolt-head, box-section, or plate. The collar E' and the nut of the bolt of course hold the box-section and plate together. Stud G' (dotted lines in Figs. 5 and 8) project from each axle-box section into corresponding recesses or sockets of the proximate plate B', preventing any slip of one of these parts over or past the other, and thus relieving bolts C' from strain and wear.

The inner axle-boxes X and their sliding plates B', suspended by the hangers F and H, as aforesaid, are prevented from rising by the fixed bars H', Figs. 5, 9, and 10, extending across the upper sliding plates. The hangers F are braced and stiffened by tension-rods J', depending from any convenient part of the bogie-frame, as shown, for example, in Fig. 6. All the hangers F and H of each pair of axles are connected together by a pair of bracing-bars I' for greater strength, such bars extending longitudinally of the said axles. As a means for automatically locking in either of these positions the wheels and parts adjustable therewith and permitting them to be automatically shifted from either one of said positions to the other I suspend a box-shaped locking-piece K' vertically between each pair of inner hangers H, the said piece presenting its front plate in the direction of motion of the machine and having therein two U-shaped slots L' with their limbs upward, the upper ends of one slot L' being on a level with the upper sliding plates B', as shown in Fig. 5, and the upper ends of the other slot L' being on a level with the lower sliding plate. Each



of these plates is provided with a lateral locking-stud M', traveling in the slot L' which is on its level. When the said sliding plates B' and their axle-boxes and axles are in their most outward position, allowing for the greatest spread of the wheels, one of the studs M' (see Fig. 5) will be in the left upper end of the corresponding slot L' and the other stud M' will be in the right upper end of the other slot, these positions being reversed when the said sliding plates, axle-boxes, axles, and wheels are moved inward, adjusting the wheels to the narrower spread for the narrow-gage track. Figs. 6 and 7 show these pins and the parts locked thereby in the broad-gage and narrow-gage positions, respectively. This locking-piece, as shown in Fig. 8, extends up between the sliding plates and bars I' on each side of the axle-box, being vertically adjustable to a higher position in which the horizontal lower parts of the slots L' are level with the bracing-studs M' and allow the same to be moved along it from one limb of each slot to the other. To thus raise the locking-piece, a longitudinal cam-plate P', Figs. 3 and 4, is fixed in the middle of the track, tapering from its highest point, which is in the middle, downward to each end. As the said piece rides up the incline of this cam-plate the slots L' are lifted until the studs M' pass down to the bottom of the limbs of said slots, which they have occupied, and are ready to permit said studs to be moved along to the other limbs thereof. When this is done, the locking-piece drops again, having then passed the highest point of its travel on the cam-plate, and the other limb of each slot L' slides down past the appropriate stud M' until the latter is in the upper limb of said slot and the wheels are locked in their narrower or broader position, as the case may be. The top of this box-form locking-piece is prevented from falling below the position indicated in Fig. 5. The work of shifting the wheels, axles, and appurtenances from one of said positions to the other is done by wheel-shifting flanges N', curved in cross-section, fastened to the inner sides of the ordinary track-rails, and forming grooves between them and the tread. Since the rails at the point of change are set to taper, as shown in Fig. 3, and the flanges of the wheels travel in the grooves formed as above, the wheels will be moved gradually toward each other, while their travel is from left to right, Fig. 3, and moved gradually away from each other while traveling in the opposite direction. The parts of the rails to which the flanges are attached, their wheel-shifting flanges, and the cam-plate are all adapted to each other with respect to length, position, and general construction to insure the gradual shifting of the wheels from one position to the other as soon as the locking-piece K is brought into position, as aforesaid, to allow

such motion. The same procedure is repeated with each pair of wheels and axles.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In combination with a pair of wheels for railway rolling-stock, a pair of independent axles for said wheels adapted to be moved outward and inward in changing the spread of the wheels, a vertically-movable locking-piece provided with U-shaped grooves, locking parts shifting with said axles and traveling in said grooves, means for automatically lifting the said locking-piece to allow the shifting of said parts from one locking position to another and means for automatically shifting the said wheels, axles and locking parts substantially as set forth.

2. In combination with a pair of wheels for railway rolling-stock, independent axles therefor, axle-boxes movable inwardly and outwardly with said axles and wheels, to vary the spread of the wheels, means for locking said wheels, axles and axle-boxes in either one of two positions of such spread, a vertically-movable box-form angularly-slotted locking-piece and a fixed cam-plate arranged to lift said locking-piece for automatically unlocking the said axle-boxes, axles and wheels and means for automatically shifting the wheels and parts moving therewith into the other position for the purpose set forth.

3. In combination with track-rails arranged to taper from one gage to another, flanges attached thereto and adapted to engage car-wheels so as to move them inward or outward, a cam-plate arranged in the track between and parallel with the said flanges and inclining from its middle down to its ends, a vertically-movable locking-piece suspended from a car or other rolling-stock and adapted to engage the inclined face of this cam-plate and ride up the same, being lifted thereby, a pair of wheels and their axles and axle-boxes movable inward and outward by the action of said flanges, and a part carried by an attachment of said axle-boxes and engaging said locking-piece to lock the said wheels against such movement but arranged to be freed by such lifting of the said locking-piece substantially as set forth.

4. The combination of a pair of inner axle-boxes, a pair of axles and a pair of wheels for rolling-stock, all moving together, with sliding plates arranged above and below the said axle-boxes, attached thereto and thus moving therewith, locking-studs on the said plates, a slotted locking-piece engaging the said studs and means for automatically moving the said locking-piece out of locking position substantially as set forth.

5. The combination of an inwardly and outwardly movable axle and its outer axle-box with inner stiffening-bars and arched



stiffening-pieces, permitting such outward movement of the said box substantially as set forth.

5 6. The combination of an axle for rolling-stock with a divided axle-box and bushings and bolts and springs holding said divided parts together with resilient pressure on the journal of the said axle substantially as set forth.

10 7. The combination of an axle-box for railway rolling-stock with means for moving the same outward and inward to vary the spread of the wheels, an axle and wheel moving with said box, a pair of sliding plates arranged  
15 above and below the said box, means for holding the said plates to said box, springs interposed between the said plates and the said box and suspending devices for the said box and plates, permitting the latter to slide  
20 in contact with them substantially as set forth.

8. In combination with an axle and wheel, an axle-box and its bushing divided into sections, bolts connecting the said box-sections,  
25 springs set into recesses of said box-sections and located between them and the bolt-heads for the purpose of pressing the said sections of bushing against the axle-journal substantially as set forth.

30 9. In combination with the axle-boxes of a truck or bogie, an under bar K extending from one of said axle-boxes to another on the same side of the bogie, a surface-plate I resting on one of the ends of the said under bar  
35 above one of the said axle-boxes and a spring L interposed between the bottom of the bogie-frame and the downwardly-bent middle part of the said bar near the end of the latter which is held by the said plate substantially  
40 as set forth.

10. In combination with a bogie-frame, the hangers F and H depending therefrom, the inner axle-boxes supported by said hangers, the sliding plates B' attached to said boxes at the top and bottom thereof and  
45 movable in and out with them in said hangers, means for thus moving the said boxes and plates inward or outward, axles and wheels moving with the said axle-boxes, brace-bars I' extending transversely of said  
50 hangers and connected thereto, a box-form locking-piece movable vertically between the inner hangers H, also between plates B' and bars I, and provided with U-shaped slots L', studs movable in said slots with the said axle-  
55 boxes and plates, and means for automatically raising the said locking-piece to free the said studs substantially as and for the purpose set forth.

11. In combination with a bogie-frame  
60 and axle-boxes, axles and wheels adjustable inward and outward to vary the spread of the wheels, the divided bars O extending lengthwise of the frame, receiving the axle-boxes between their integral portions and  
65 slotted at O<sup>2</sup> to permit their movement outward and inward with said boxes, brake-spindles extending transversely of the frame through said slots and elongated at the ends to permit such movement of said bars, and  
70 brake-shoes mounted on said spindles and movable with said bars toward and from the wheels substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

JAMES CHARLES HINTON.

Witnesses:

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C. W. BULTITUDE.