

(No Model.)

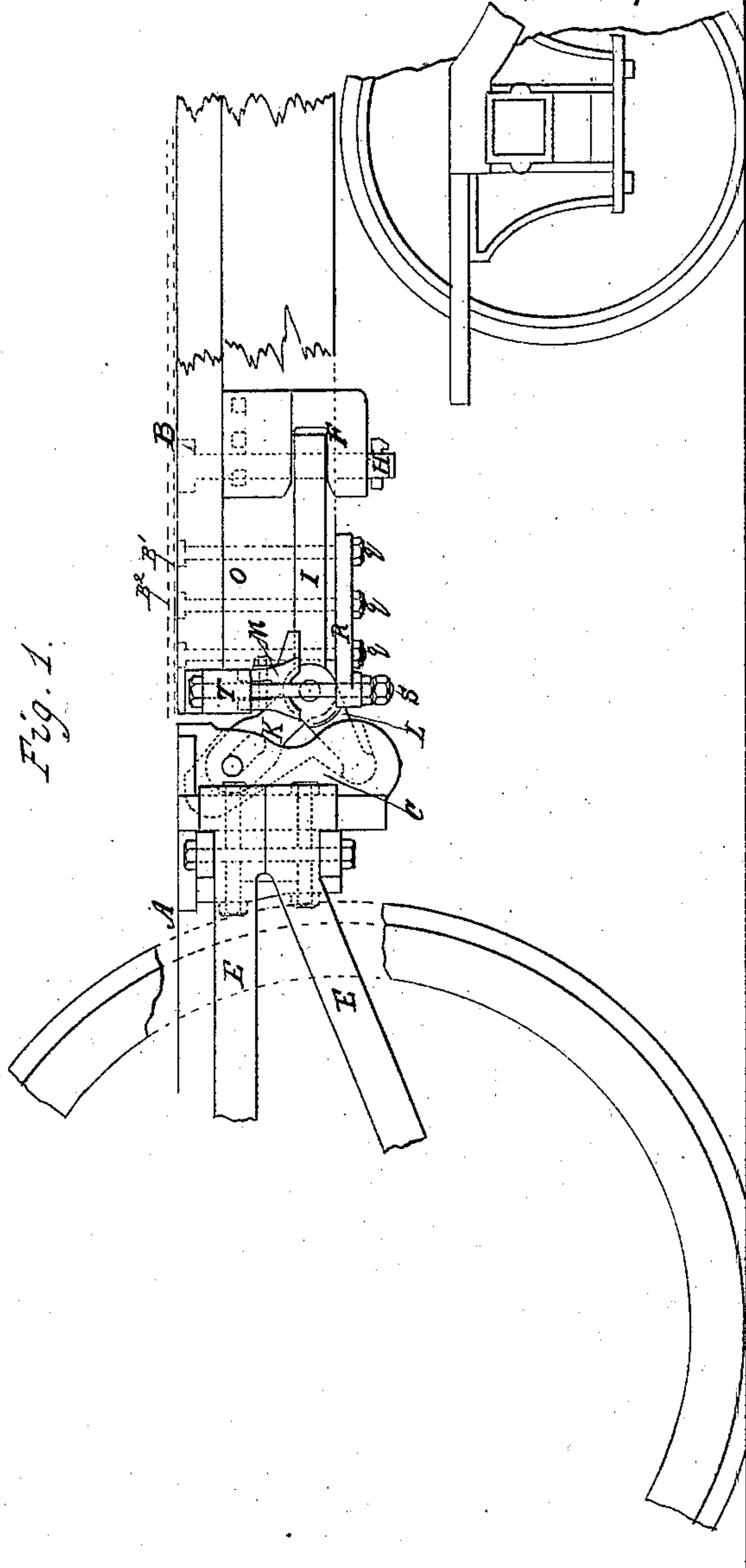
5 Sheets—Sheet 1.

T. C. CRAVEN.

DRAW BAR FOR LOCOMOTIVES.

No. 311,963.

Patented Feb. 10, 1885.



Witnesses:

Chas. S. Kirk
Alex. Selkirk Jr.

Thomas C. Craven

Inventor.
By his Attorney Alex. Selkirk.

(No Model.)

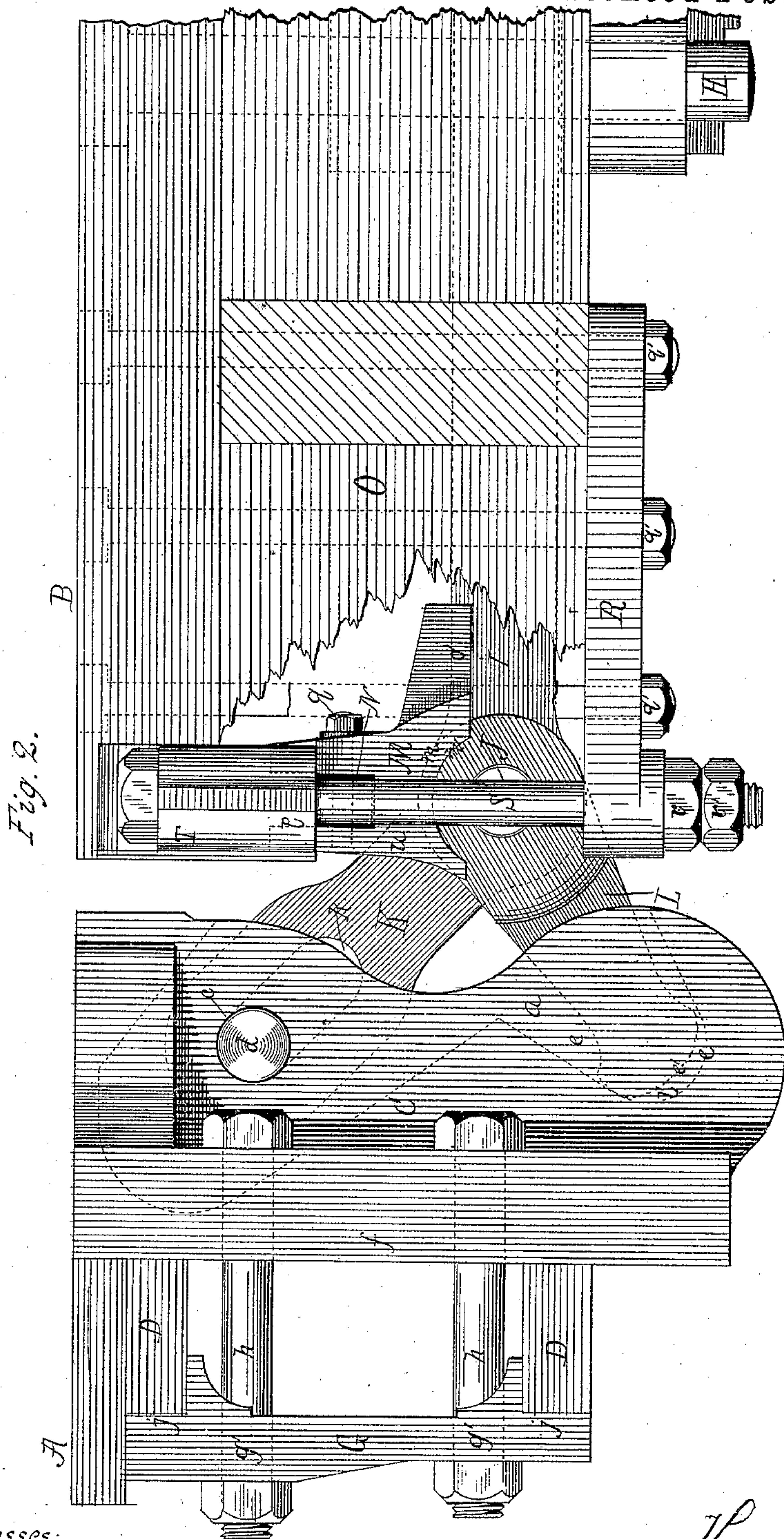
5 Sheets—Sheet 2.

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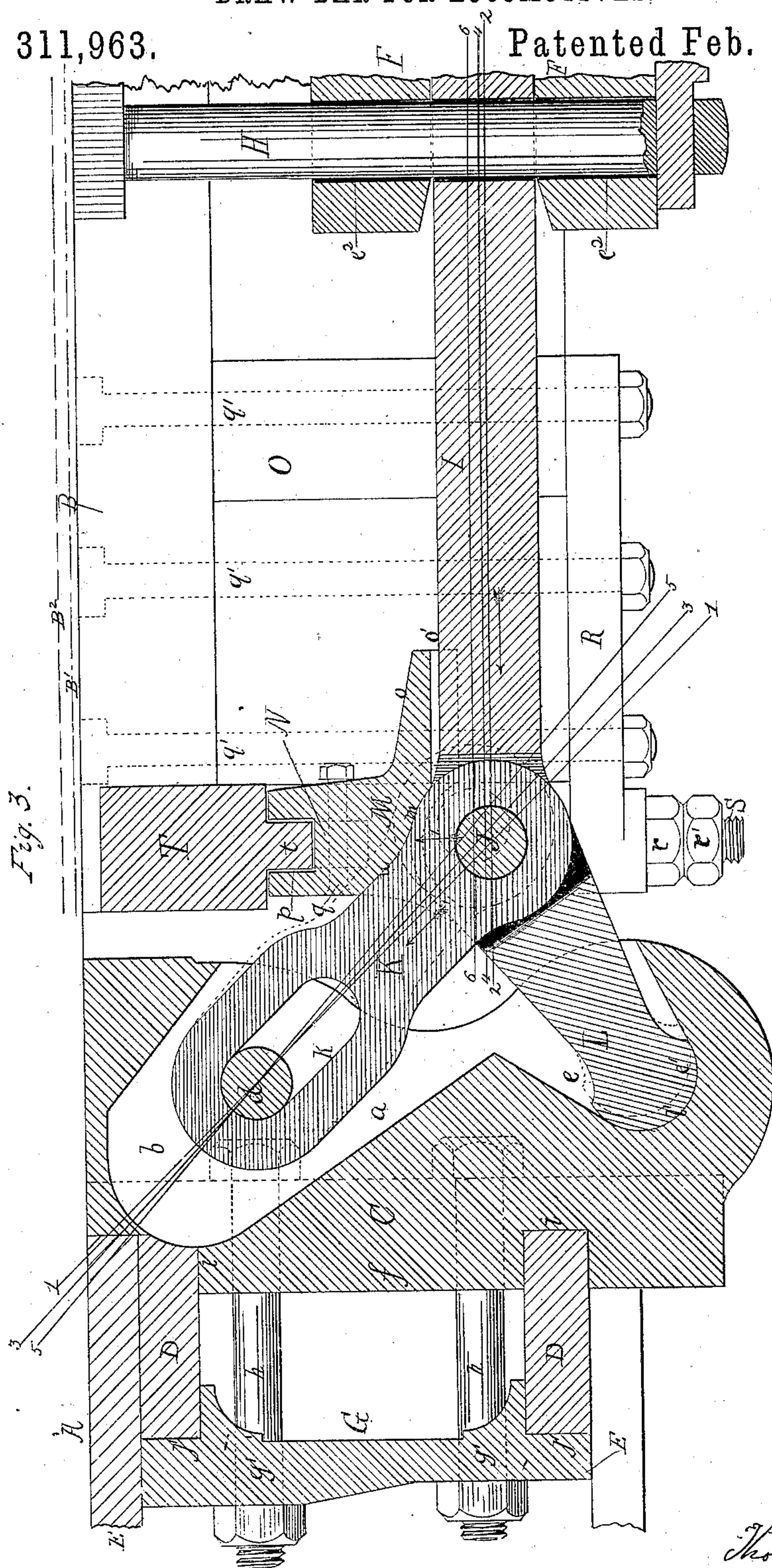


Fig. 3.

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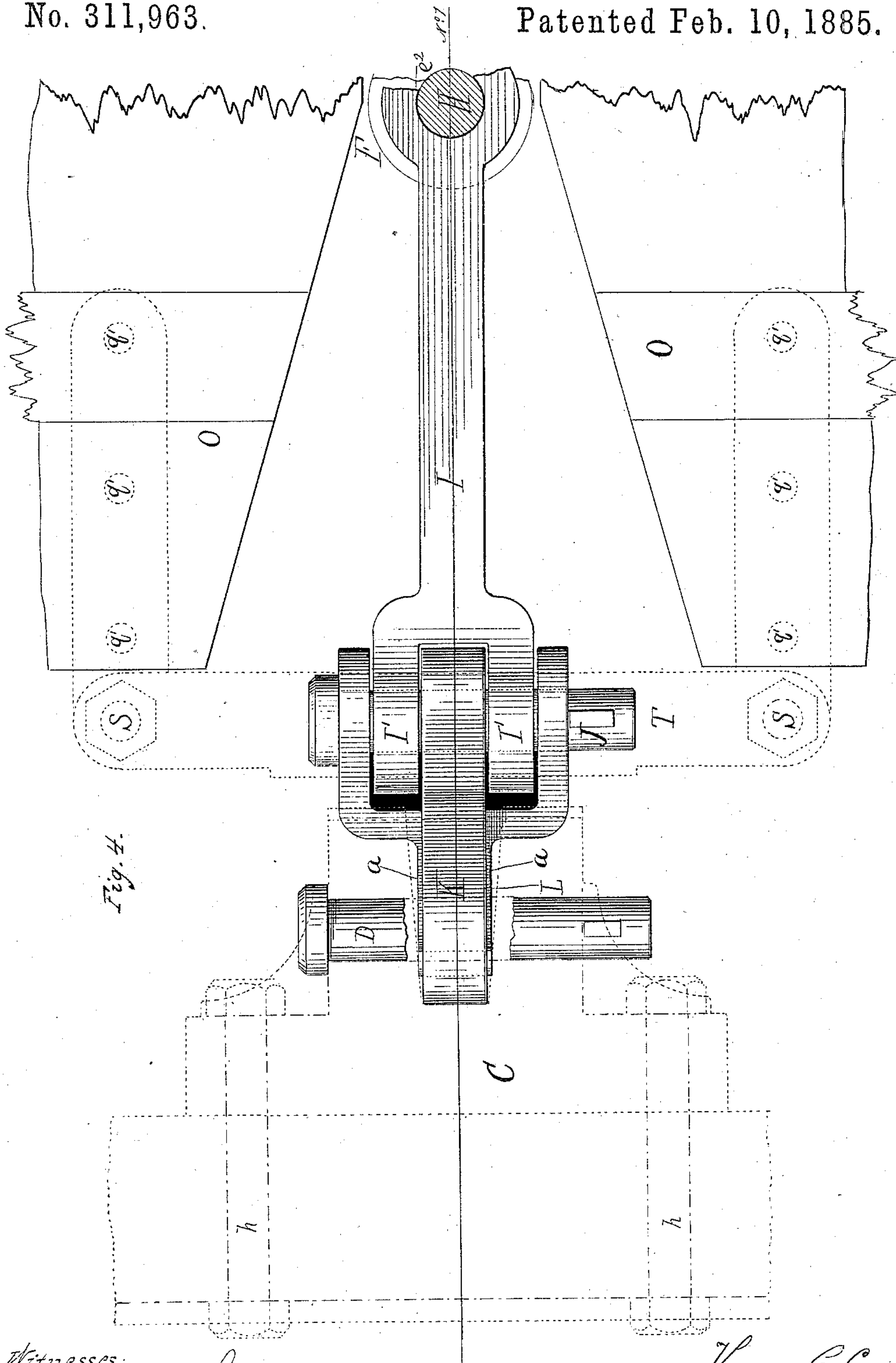
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(No Model.)

5 Sheets—Sheet 5.

T. C. CRAVEN.

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Fig. 5. Patented Feb. 10, 1885.

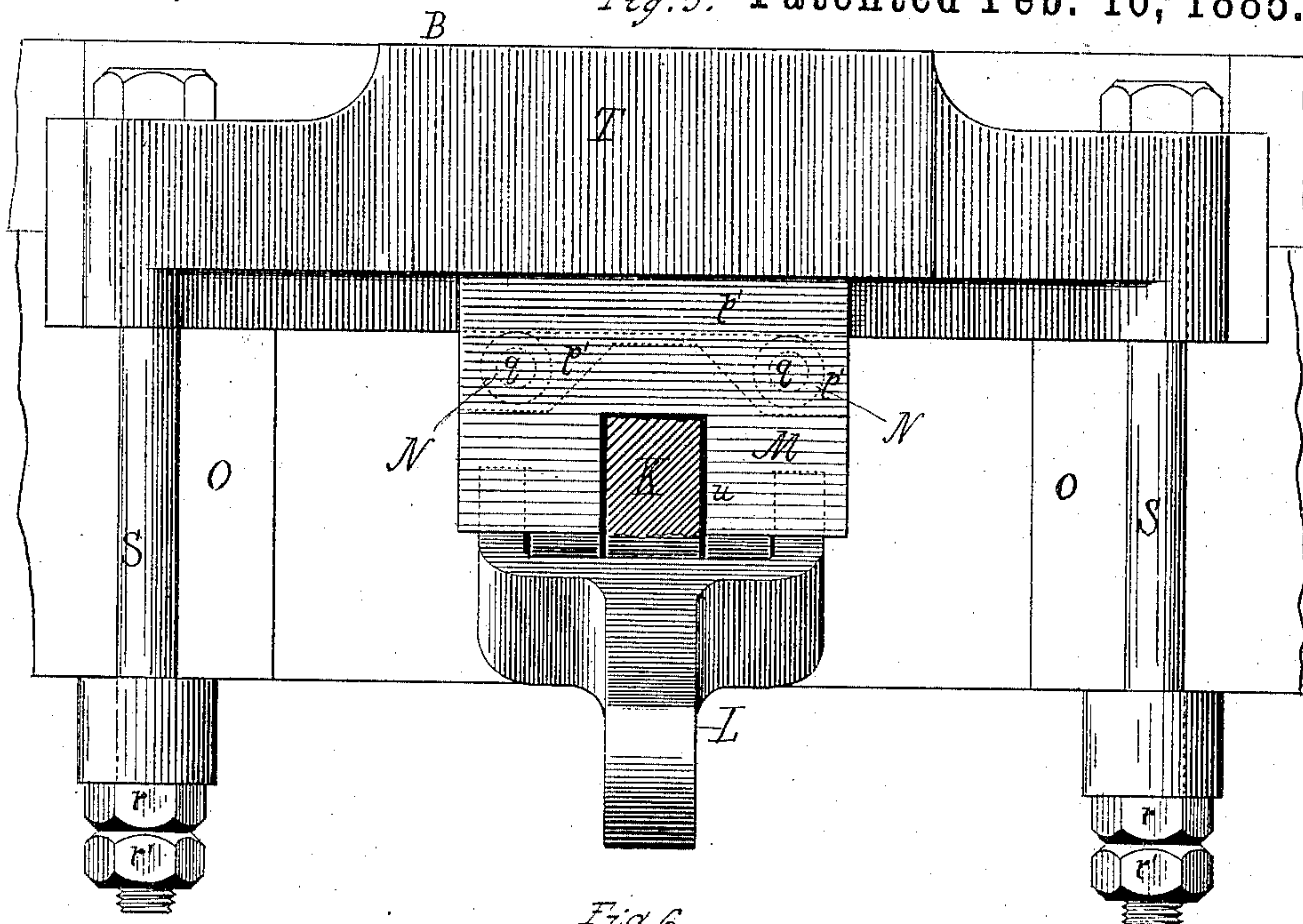
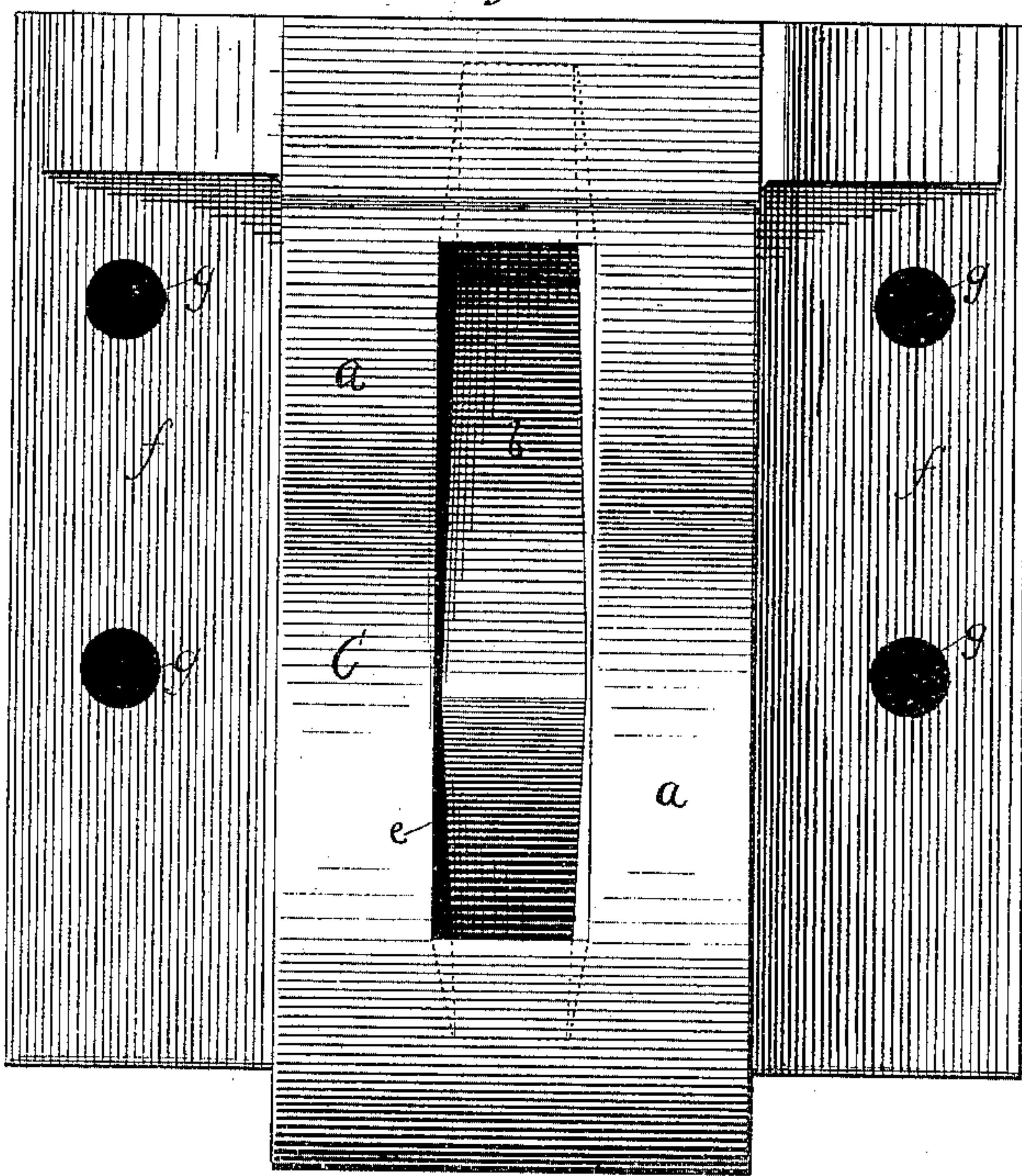


Fig. 6.



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UNITED STATES PATENT OFFICE.

THOMAS C. CRAVEN, OF GREENBUSH, ASSIGNOR TO THE AUTOMATIC TRACTION DRAW BAR COMPANY, OF ALBANY, NEW YORK.

DRAW-BAR FOR LOCOMOTIVES.

SPECIFICATION forming part of Letters Patent No. 311,963, dated February 10, 1885.

Application filed December 18, 1883. (No model.)

To all whom it may concern:

Be it known that I, THOMAS C. CRAVEN, a citizen of the United States, and a resident of Greenbush, in the county of Rensselaer and State of New York, have invented certain new and useful Improvements in Draw-Bars for Coupling Locomotives with their Tenders, of which the following is a specification.

My invention relates to improvements in the class of draw-bars for which Letters Patent to T. B. Purves and myself, No. 271,269, were granted January 30, 1883, to adapt this class of draw-bars to be employed with all classes and styles of locomotives for their connection with tenders.

The objects of my invention are to provide mechanism by the means of which the hinge-jointed link and bar and lifting-strut jointed therewith will be readily applied to all classes of locomotives and their tenders for operations to effect an increase of weight on the driving-wheels of the former by a transfer in a new manner to the said wheels the weight of the forward portion of the latter when the locomotive is pulling or backing; and, further, to dispense with the support (employed by Purves and myself in our older invention) for the outer end of the draw-bar, and by a new situation and arrangement of the draw-link in relation to other devices employed cause this link at all times to give a reliable support to the outer end of the draw-bar, and thereby remove all liability to a loss of support of that bar by accident, to which the older bar is liable; and, further, to provide on the upper side of the draw-bar, while it is supported by the draw-link, a support for the front portion of the tender, and thereby dispense with the hinged pendants and saddle-sustaining yoke heretofore employed, (by Purves and myself for supporting the weight of the forward part of the tender through the medium of a supporting-block applied to the lower side of the draw-bar, which parts have been found to be very liable to breakage, thereby causing troublesome delays and great liability of accident to the train when moving,) and whereby the free end of this strut will, by its own gravity, fall into a new situation, where it will be safe from

accidental breakage whenever from any cause whatever the mechanism applied to the upper side of the draw-bar for the support of the tender is removed, thereby removing all liability of accidental breakage of the strut when backing, to which the strut (in the patent referred to) is liable when the supporting devices of the draw-bar, as in the patent, are from any cause whatever removed; and, lastly, to provide certain more durable and readily applicable devices and parts, in combination with the conjoined lifting-link, draw-bar, and strut, which will render the draw-bar attachment less liable to breakage and derangement of parts than those used in the older invention referred to, and be also less liable, in case of breakage of parts, to cause delay of the train or accident when the train is being moved in either direction. I accomplish these objects by means of mechanism illustrated in the accompanying drawings, (in five sheets,) which form a part of this specification, in which—

Figure 1 represents a locomotive and its tender coupled together by my improved coupling device. Fig. 2 is a side elevation, on an enlarged scale, of the coupling device as applied to a locomotive and tender. Fig. 3 is a sectional elevation of the same, taken at line No. 1 in Fig. 4. Fig. 4 is a view of the same from above. Fig. 5 is a front elevation of the mechanism secured to the tender; and Fig. 6 is a front view of the coupling-plate which I employ with the locomotive.

In the drawings, A represents the locomotive, to which portions of the mechanism in this invention are applied, and B is the tender, to which other portions are applied.

Secured to the rear end of locomotive A is coupling-plate C. This plate is preferably made of cast-iron, and has made central in its upper portion and between cheeks *a a* the draft-link recession *b*, which extends upwardly and inwardly from the face of said plate, as shown. The sides of cheeks *a a* are pierced with hole *c*, for receiving the draw-pin *d*. This recession *b* extends inwardly and upwardly past the center of draw-pin hole *c* to a distance of six or seven inches, and has a vertical extension sufficient to allow the draw-link to vi-

brate freely in a vertical direction on the draw-pin. Made also central in coupling-plate C, and in the lower portion thereof between the cheeks *a*, is the jack-strut socket *e*, which socket
5 extends inwardly and downwardly from the face of said plate in a gradually-contracting manner, and has a concave form of termination in the lower portion of the plate. This coupling-plate is provided with laterally-extended
10 vertical flanges *f f*, pierced with holes *g*, for receiving connecting-bolts *h h*. The back of plate C is provided with horizontal grooves *i i*, which receive the front edge portion of cross-bars D D, secured to the side bars, E E, of the
15 locomotive-frame.

G is a tie-plate, made preferably of cast-iron, and with an extension from side to side about equal to the width of coupling-plate C, and with a vertical depth about equal to the distance between bars E E, and is provided with
20 shoulders *j j*, fitting nicely with cross-bars D D. This plate is pierced with holes *g'* at points corresponding with holes *g* in coupling-plate C. The connecting-bolts *h h*, passing through
25 plates C and G, clamp both firmly to cross-bars D D, and hold the coupling-plate rigidly secured from shifting with the locomotive.

Firmly secured to the lower side of tender B is the draw-bar coupling-socket F, which is
30 pierced vertically with hole *e'* at a point about thirty inches (more or less) back from the front of the tender. Pivoted to this coupling-socket by coupling-bolt H is a horizontal draw-bar, I, having its forward end pivoted with ears I'
35 I', pierced to receive pin J.

Coupled with the forward end of draw-bar I by pin J is the lifting-link K, which link has its forward and upper end provided with oblong or slot-form eye *k*, having a width equal
40 to the diameter of coupling-pin *d*. The upper and slotted end of lifting-link enters the recession *b*, and is coupled with plate C by coupling-pin *d*, working in slotted pin-hole *k*, as shown.

Coupled also to the forward end of draft-bar I is the jack-strut L, which strut has made with its rear and upper end branching ears which straddle the forward end of said draw-bar. These ears are pierced with holes corresponding with the diameter of coupling-pin
50 J, which pin holds both the lifting-link K and this jack-strut flexibly connected with the draw-bar I. This jack-strut extends from coupling-pin J downwardly and forwardly to the bottom of socket *e*, made in coupling-plate C, attached to the locomotive, and has its terminating end *l'* made convex and on a curve of a true circle corresponding with the concavity of said socket.
55

The pierced ear ends of draw-bar I, lifting-link K, and jack-strut L (coupled together by pin J) are each made of the same curvature—*i. e.*, with a circular form from the same radius each with the other.
60

M is the jack-saddle, which is provided in its lower side with a concave seat, *m*, corre-

sponding with the convexity of the surfaces of the conjoined ear portions of the draw-bar I, link K, and strut L. A rearwardly-projected foot, *o*, made with this saddle, extends
70 over the body of the draw-bar to a short distance back of its ears, and is designed to co-operate with the concave form of seat *m*, to prevent the saddle from rocking or tilting in either direction. At each side of this concave seat is a heavy flange, *m'*, which projects
75 downwardly and has bearing against the outer side surface of the ears of the jack-strut. These flanges *m'* are made continuous with flanges *o'*, projecting down from the foot *o* of
80 the saddle, and flanges *o'* have bearing against the sides of the draw-bar, back of its ears, and co-operate with flanges *m'*, to prevent the saddle from shifting endwise. Made in the upper side of this jack-saddle is the horizontal
85 grooved way *p*, extended vertically to a short distance below the upper surface of the saddle. The end portions of this grooved way are each sunken below the plane of the bottom of said groove to a distance of about two inches
90 or more, and form recesses *p' p'*, (shown by dotted lines in Fig. 5,) into which are mounted on pins *q* (made of steel) rollers N N, Figs. 2, 3, and 5. This jack-saddle is mounted upon the upper side of the several conjoined ears
95 of the draw-bar, draw-link, and jack-strut, and is carried by the same, while the draw-bar is supported in position by the draw-link, as shown in Figs. 2 and 3. In this situation this saddle serves as a reliable support for the
100 front portion of the tender when lifted; but in no case does it serve as a support to the draw-bar, which is shown to be supported in a horizontal position by the link K, coupled with the locomotive. For connecting the tender with this saddle I provide with the tender mechanism having parts which are adjustable in relation to each other in a vertical direction.

Secured firmly to the lower side of tender B
110 are the "dead-wood" blocking-timbers O O, made of hard wood. These blocking-timbers are placed off from the sides of the draw-bar I, as shown, and are firmly secured to the tender by bolts *q'*. Secured to the lower side
115 of each of these blocking-timbers by bolts *q'* is a heavy lifting-bar, R, the forward ends of which bars project in front past the ends of the dead-wood blocking-timbers O O, as shown, and the head ends of these bars are each provided with a hole to receive a jack-bolt, S,
120 provided with screw-threaded nut *r* and mash-nut *r'*.

T is the jack bar or beam, which is provided on its lower side with tongue *t*, projected vertically downward to a distance about equal to the depth of grooved way *p* in the upper side of saddle M. Made in the end portions of this jack-bar are vertical holes *t' t'*. (Shown by dotted lines in Fig. 5.) These holes are made
125 with a size and form corresponding with that of jack-bolts S, which these holes receive. The
130

bar is made with a length to admit the said bolts to enter these holes without binding when being moved vertically in either direction. This jack-bar is made of cast-iron, with the lower side of its tongue *t* of chilled metal, so as to prevent the rollers *N N* in the saddle from indenting the lower and bearing surface of this tongue, and thereby preserve the said surfaces with a uniformly even plane, to insure the ready carriage of the saddle in either direction accordingly as the draw-bar is vibrated horizontally, as when running on a curve.

In arranging and securing the above-described parts in place I first secure the coupling-plate *C* to the locomotive, as above described, and couple (by bolt *H*) the draw-bar *I* to the tender, and then couple the lifting-link *K* by pin *d* to coupling-plate *C*, and enter the convex foot end of jack-strut into its socket in said coupling-plate, and couple the lifting-link *K* and jack-strut *L* to the draw-bar *I* by pin *J*, when the two former will hold the draw-bar in a horizontal position, and the weight of the tender will be supported solely by its truck-wheels *w*. The jack-saddle *M* is then placed in position, with its concave seat *m* resting on the coupled ear end of draw-bar *I*, lifting-link *K*, and jack-strut *L*, with flanges *m'* lapping over on the outer sides of the branch ears of the jack-strut, as shown. The jack-beam *T* is then placed in position, with its tongue *t* resting on the friction-wheels *N* in the jack-saddle *M*, and the jack-bolts *S* are then passed down through the pierced ends of jack-beam *T* and through the ear ends of lifting-bars *R*, with nut *r* and mash-nut *r'* screwed on the lower ends of bolts *S*. Thus arranged, the several parts in this invention will be in proper place and connection, and as illustrated by full lines in Figs. 2 and 3, without the weight of the tender being borne in the least by the locomotive when the latter is not pulling on the tender.

With the above-described arrangement and connection of parts, with the condition of the foot end *l'* of jack-strut *L* resting on the bottom of socket *e* and the lifting-link *K* coupled on pin *d*, the head end of the draw-bar *I* will be held horizontal and from dropping down, and when the locomotive is made to pull on the tender and the train of cars (coupled therewith) for hauling the same the resistance or load being hauled will draw on the locomotive through draw-bar *I* and lifting-link *K*, and the line of draft—which, without resistance, is through lines 1 and 2, Fig. 3—will be slightly changed in the angle of direction, and will be in direction of lines 3 and 4 in the same figure, with the lower end of lifting-link *K* carried slightly upward in direction of arrow 1, with the center of the coupling-pin *J* elevated to line 4, and the head of draw-bar *I* correspondingly raised in relation to line 1, while the foot end of jack-strut *L* will be lifted from the bottom of socket *e* in coupling plate *C* to line *e'*. This elevation of the coupled ends

of draw-bar *I*, lifting-link *K*, and jack-beam *T* upward to position shown by dotted lines in Fig. 3 draws upward on lifting-bars *R* through jack-bolts *S*, and thereby raises the front end of the tender to dotted lines *B'* in the same figure, when a portion of the weight of the front end of the tender and its load will be transferred to the locomotive, and thereby increase the weight on the driving-wheels of the same and cause an increase of friction between said wheels and the rails they run over, while another portion of the weight of the tender will be sustained by the usual springs supporting the tender from its trucks. The condition shown by full lines in Fig. 3—when the tender is not “jacked” up by the above-described mechanism and is lifted only when the locomotive is hauling a load coupled behind the tender—may be continued with the tender and locomotive on level roads; but on roads having various grades I effect another condition, in which the locomotive will at all times sustain a portion of the weight of the tender and its load, (whether at rest or hauling a train,) and this weight on the locomotive driving-wheels will be increased in addition thereto accordingly as the draft of the locomotive is resisted by the load pulling on the tender. This other advantageous condition is effected by tightening nuts *r* and *r'* of jack-bolts *S* against lifting-bars *R*, and thereby effect a “jacking” or lifting up of the tender from full lines in Figs. 1 and 2 to position of dotted lines *B'* in same figures. In this condition the springs of the truck of the tender will be relieved of a portion of the weight of the tender and its load, which weight will be transferred directly to the locomotive and its driving-wheels. When the locomotive is hauling a load behind the tender, the pull of the locomotive on lifting-link *K* and draw-bar *I* will be such as to change the lines of draft on said bar and link from lines 3 and 4 to lines 5 and 6, as illustrated in Fig. 3, when the springs between the tender and its truck will sustain a less portion of the weight of the tender, while the weight of the tender on the driving-wheels of the locomotive will be proportionately increased, as the pull of the locomotive will raise the tender from dotted lines *B'* to that of *B''*, as illustrated in Figs. 1, 2, and 3.

In the forward pull of the locomotive on the draw-link and draw-bar the jack-strut will be drawn forward from the bottom socket, *e*, in coupling-plate *C*, and when the locomotive is made to back toward the tender the lifting-link *K* will be shoved upward into recess *b*, (the slot *k'* in its upper end permitting such movement,) while the foot end of jack-strut *L* will be received against the bottom of recess *e* and be forced upward and rearward against jack-saddle *M*, and thereby effect a raising of the tender through jack-beam *T*, bolts *S*, and lifting-bars *R*, when a portion of the weight of the tender and its load will be transferred to the locomotive, and the fric-

tion of its driving-wheels with the rail will be increased.

By means of the above-described devices and parts, together with their respective situations and arrangements in relation to each other and to the locomotive and tender they are respectively connected with or attached to, the employment of the jointed link and bar K I and strut L is not limited to use with but a single class of locomotives, as are these devices when employed as arranged and combined with the coacting devices shown in the patent to Purves and myself, before mentioned, as by the above-described improvements this link, draw-bar, and strut can be readily applied to all classes of locomotives and their tenders.

The great distinguishing features in my invention above described are, first, the employment of the draw-link for support from the locomotive of the outer end of the draw-bar, thereby dispensing with the use of the hinged pendants, yoke-bar, and saddle heretofore employed to support that bar, which supporting devices have been found in practice to be deficient in strength and requiring constant watching and repairs, and subject to frequent breakage while the train is moving; second, in the employment of a support for the tender, which is applied to the upper side of the draw-bar for receiving the weight of the tender for its transfer to the locomotive through this draw-link, which supports the said draw-bar, thereby dispensing with the use of the unreliable supporting devices employed in the older invention referred to, which old devices have been found in practice to be greatly liable to become broken away by reason of the downward pull from the tender of the draw-link, and thereby render the coupling attachment defective and inoperative for hauling or backing a train; and, third, in the employment, with the draw bar and link, of a jack-strut which has a pendent character of connection with those parts, whereby the strut will, by its own gravity, swing back from its inclined position and out from its foot and support from the tender to a pendent position whenever from any cause the support for the tender on the draw-bar is removed, and thereby assume a situation in which it (this strut) will be held harmless and allow the locomotive to haul or back without causing accident.

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

1. In a coupling attachment between a locomotive and tender, the combination and arrangement, with a horizontal draw-bar which is connected with the lower side of the tender at a point distant from its front end, and a draw-link jointed to the outer end of said draw-bar and coupled at its opposite end to the locomotive at a point on a plane above the draw-bar, so that said link is made to support

the forward end of said bar, of a support for the tender applied to the upper side of the outer end of the draw-bar, substantially as and for the purposes set forth.

2. In a coupling attachment between a locomotive and tender, formed by a lifting-link which is jointed with a horizontally-arranged draw-bar coupled with the tender, the combination, with said horizontal draw-bar, of a jack-strut having a joint-connection with said bar, supporting-socket secured to the locomotive and receiving the free foot end of said jack-strut at a point therein on a plane below the draw-bar, and a support for the tender applied to the upper side of the jointed ends of said draw-bar and jack-strut, substantially as and for the purposes set forth.

3. In a coupling attachment between a locomotive and tender for hauling and backing the latter, the combination and arrangement, with a horizontal draw-bar coupled with the tender, lifting-link coupled at one end to the locomotive and supporting the forward end of the draw-bar by having a jointed connection with the same, and a jack-strut coupled with the draw-bar and having its free foot end supported in a recess or socket attached to the locomotive at a point below the plane of the draw-bar, of a support for the tender, which is applied to the upper side of the common joint-connections of the draw-bar with the lifting-link and jack-strut, substantially as and for the purposes set forth.

4. The combination, with coupling-plate C, provided in its face side with recesses *b* and *e*, with coupling-link hole *c* through the sides of recess *b*, and having in its rear side horizontal grooves *i i*, of tie-plate G, cross-bars D, secured to the locomotive, and bolts *h h*, substantially as and for the purposes set forth.

5. In a draw-bar attachment between a locomotive and its tender, the combination, with draw-bar I, arranged and coupled horizontally with the tender, with its forward end supported by lifting-link K, coupled with the locomotive at a point above the plane of its connection with the draw-bar, and jack-strut L, jointed with said draw-bar and lifting-link, and having its free foot end working in a recessed step securely attached to the locomotive at a point below the plane of the jointed connection of said strut with the draw-bar, of the jack-saddle M, constructed as above described, and applied to the upper side of the jointed ends of the bar, link, and strut, and mechanism securely connected with the tender and applied to the upper side of said jack-saddle, substantially as and for the purposes set forth.

6. The combination and arrangement, with the draw-bar I, lifting-link K, and jack-strut L, constructed and arranged in relation to each other and the locomotive and tender as above described, of the jack-saddle M, provided on its upper side with way P and rollers N, and applied to the upper side of the draw-

bar, jack-beam T, provided with tongue *t* and applied to the upper side of said jack-saddle, and mechanism secured to the tender for forcing said beam down on the said saddle, substantially as and for the purposes set forth.

7. The combination, with jack-saddle M, applied to the upper side of the draw-bar I, arranged and connected at its ends as above

described, and jack-beam T, applied to the upper side of said saddle, of dead-wood O, 10 lifting-bars R, and jack-bolts S, substantially as and for the purposes set forth.

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Witnesses:

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WILLIAM G. WEED.