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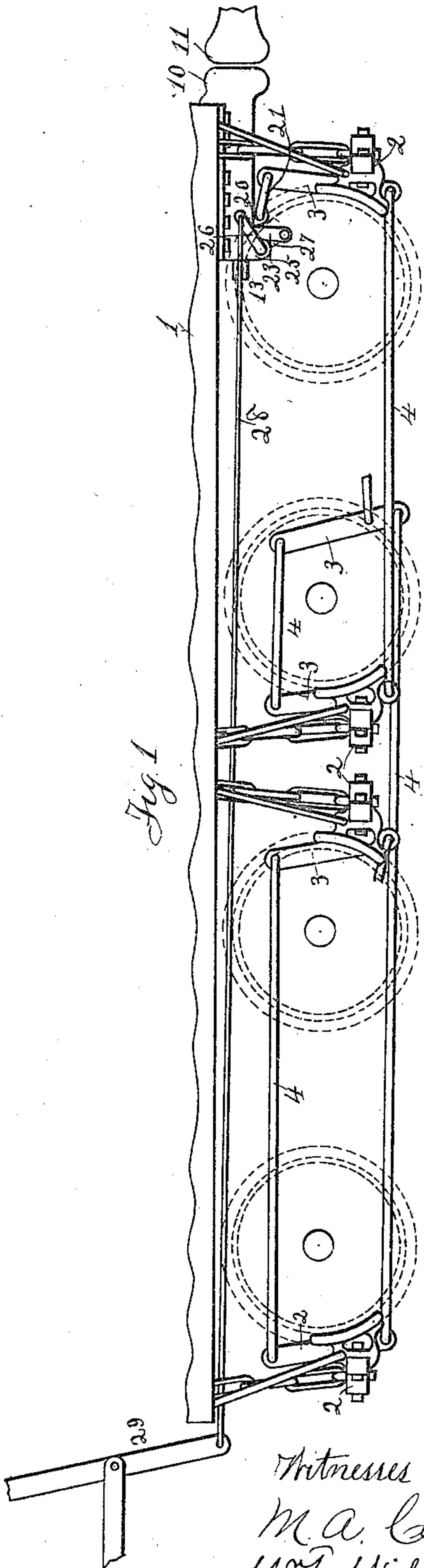
Patented Aug. 13, 1901.

J. J. SMITH.  
COUPLING BRAKE.

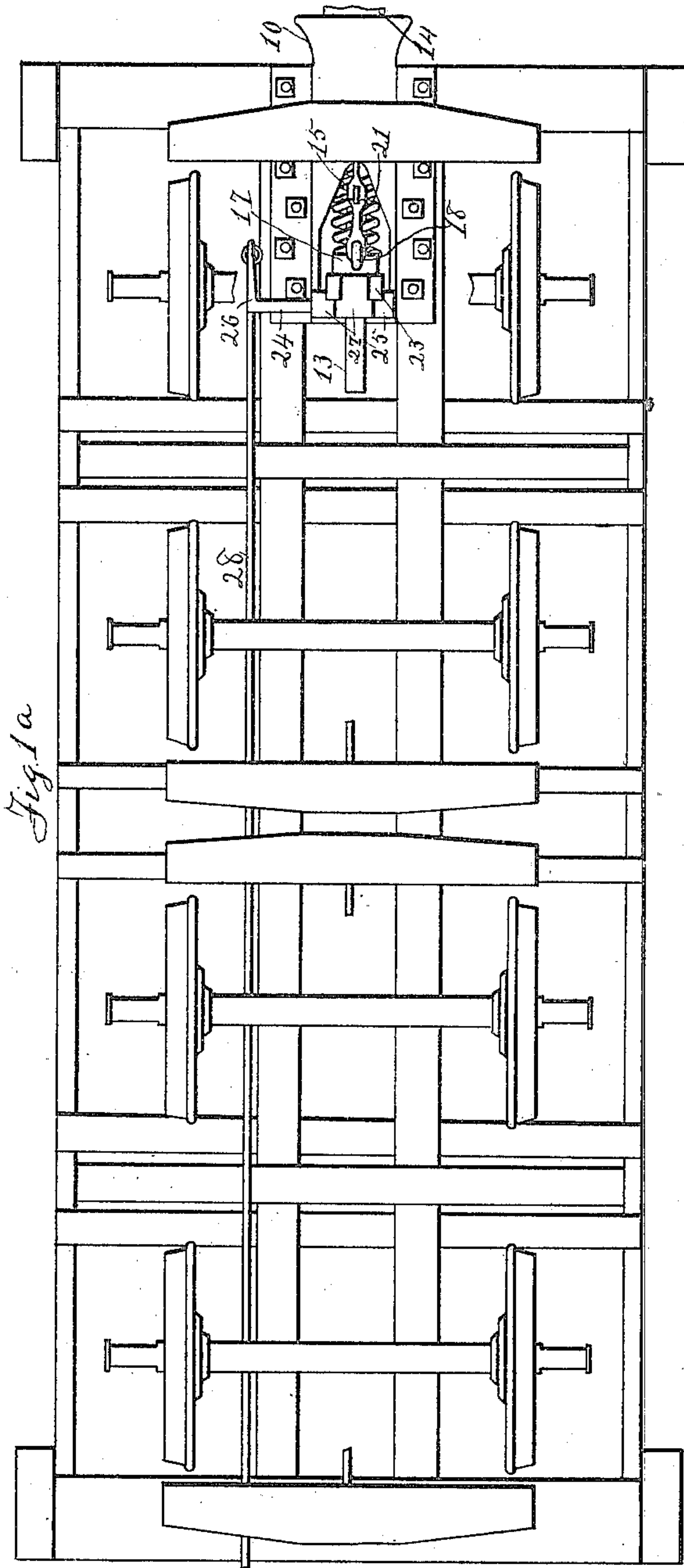
(Application filed Aug. 26, 1899. Renewed Dec. 28, 1900.)

(No Model.)

3 Sheets—Sheet 1.



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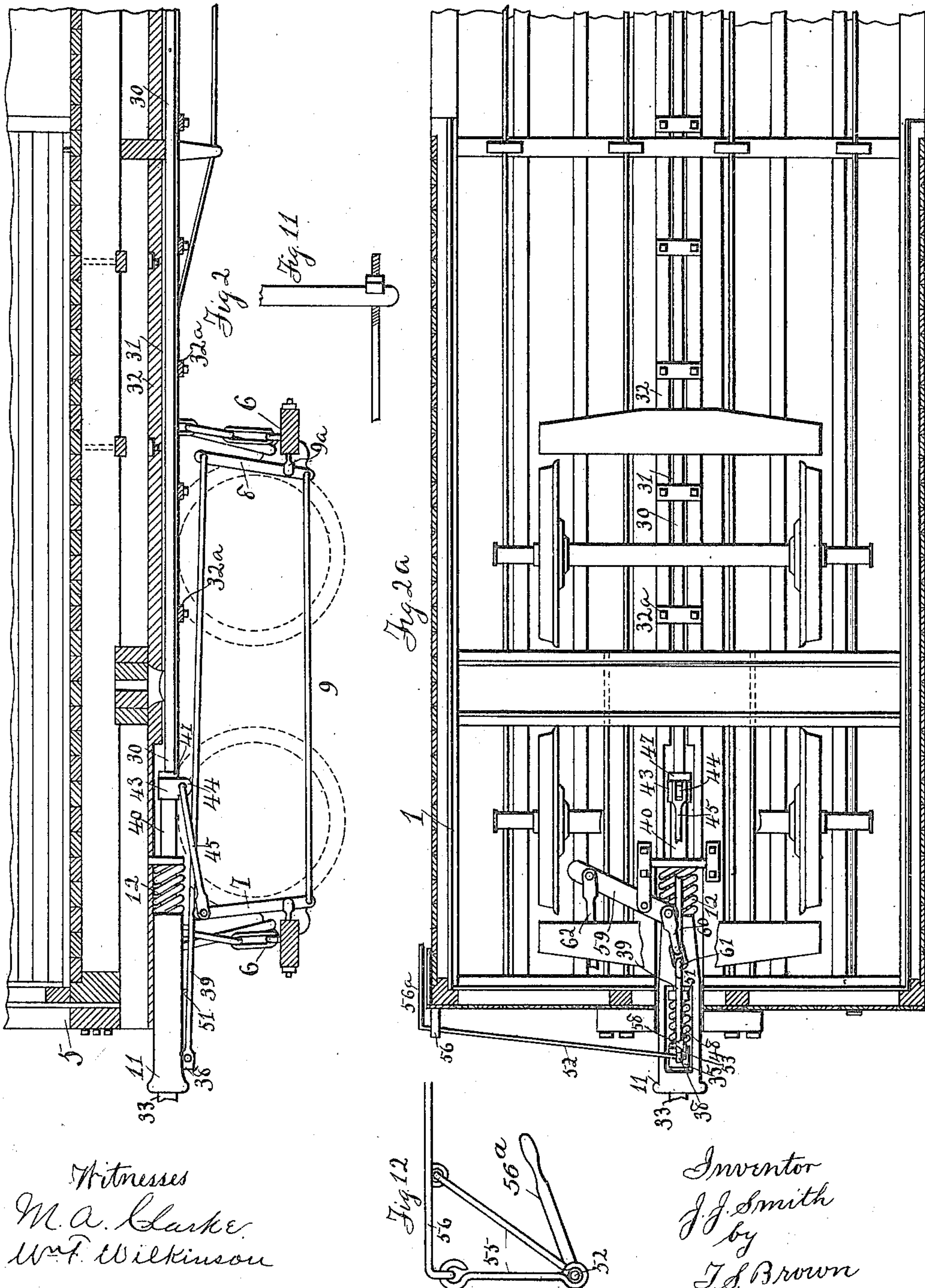
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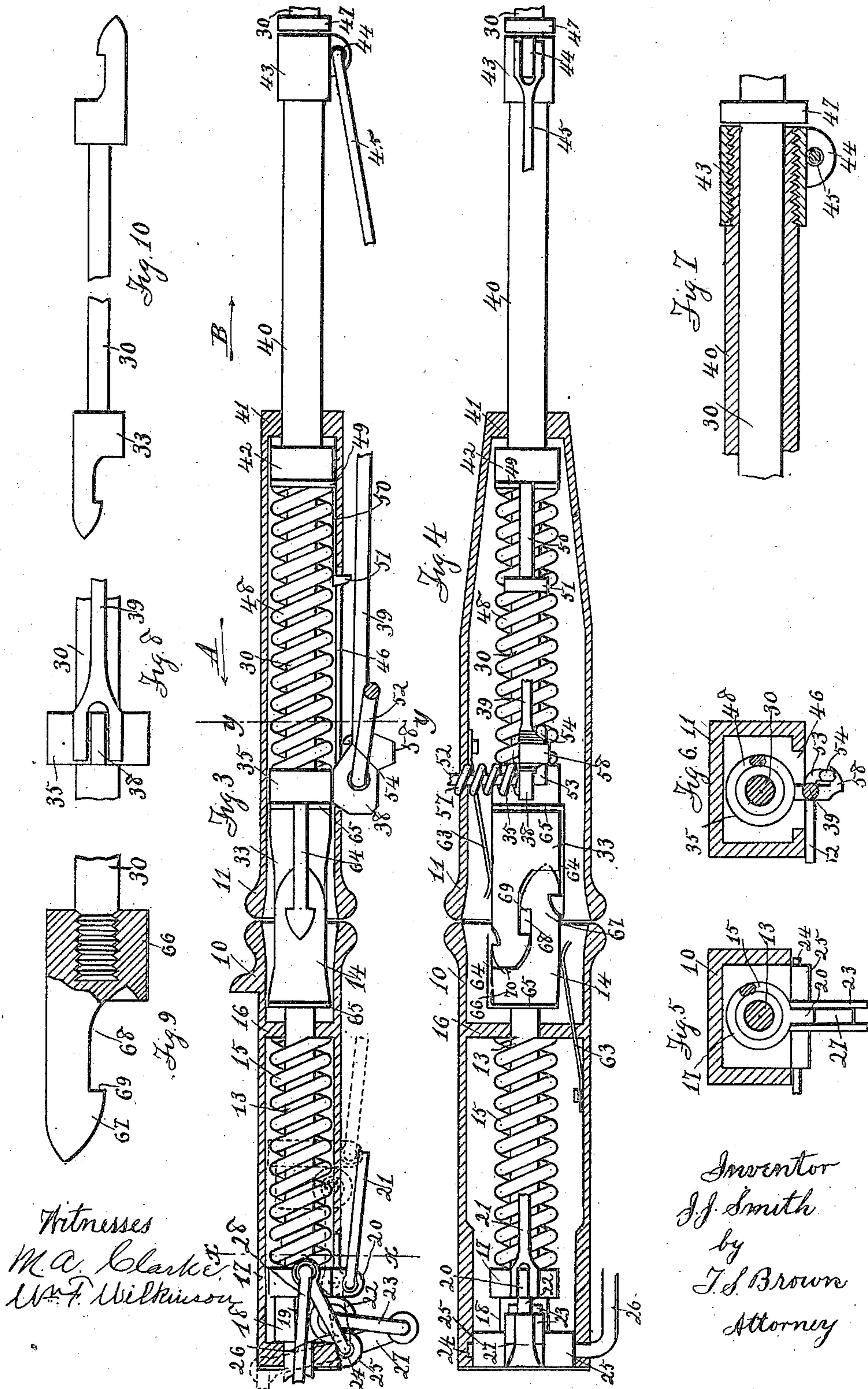
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3 Sheets—Sheet 3.





# UNITED STATES PATENT OFFICE.

JOHN J. SMITH, OF PIERCE CITY, MISSOURI.

## COUPLING-BRAKE.

SPECIFICATION forming part of Letters Patent No. 680,676, dated August 13, 1901.

Application filed August 26, 1899. Renewed December 28, 1900. Serial No. 41,416. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN J. SMITH, of Pierce City, in the county of Lawrence, in the State of Missouri, have invented a certain new and  
5 useful Coupling-Brake, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to a certain new and  
10 useful mechanism in contradistinction to the air-brake on railroad and other cars and may properly be designated a "coupling-brake," in which the brakes are applied by the action of mechanism connected with and operated  
15 by the car-couplings upon the slacking of the couplings incident to checking the speed of the train, and are released by the taking up of the slack between the cars as the engine begins to move the train, said mechanism  
20 being absolutely positive and automatic in its action to apply and release the brakes; and my invention consists in certain features of novelty hereinafter described, and pointed out in the claims.

25 Figure 1 represents a side elevation of a tender, showing the application of my coupling-brake thereto. Fig. 1<sup>a</sup> represents a bottom plan view of the same. Fig. 2 represents a half-section of a box or flat car, showing my coupling-brake applied thereto. Fig.  
30 2<sup>a</sup> represents a bottom plan view of the same. Fig. 3 represents an elevation, the draw-heads being in cross-section, showing the coupling mechanism whereby in my coupling-brake the brakes are automatically and  
35 positively applied, operated, and released, the view being intended to represent the coupling of the tender and the car next thereto. Fig. 4 represents a bottom plan view of the same, the draw-heads being in cross-section. Fig. 5 represents a vertical cross-section on the line X X of Fig. 3. Fig. 6 represents a vertical cross-section on the line Y Y of Fig. 3. Fig. 7 represents a partial cross-section of the sleeve and collar on the coupling-hook rod. Fig. 8 represents a detail  
45 view showing connection of brake-connection rod with its collar. Fig. 9 represents a cross-section of the coupling-hook, showing its connection to the hook-rod. Fig. 10 represents a detail view of coupling-hook rod of car partly broken away, showing coupling-

hook on its opposite ends. Fig. 11 represents a detail view of a preferred means of connecting the connecting-rod to the brake-le-  
55 ver. Fig. 12 represents a detail elevation of the bracket supporting the rock-shaft controlling the switching-lock.

Similar numerals refer to similar parts throughout the several views. 60

1 represents the frame of a locomotive-tender.

2 represents the brake, which may be of any usual or desired construction.

3 represents the brake-levers, and 4 represents the brake-rods connecting brake-levers, the same being the usual brake mechanism of the tender. 65

5, Figs. 2 and 2<sup>a</sup>, represents the frame of a car, (as here shown the car next the tender,) 70 the brakes 6, being in this relation the brakes of the front truck, only being shown; 7, the lever of the front brake; 8, the lever of the rear brake, and 9 the connecting-rod connecting the two levers, as shown in Fig. 11. 75 I preferably connect this connecting-rod with the brake-lever by passing a rod through the lever and threading a nut on the end of the rod, whereby the rod may be shortened between the levers to take up the loss due to 80 the wear on the brake-shoe, or such loss may be taken up by tightening the nut on the link 9<sup>a</sup>, connecting the lever with the brake-beam, it being understood that the brakes, lever, and connecting-rod of the rear truck are identical therewith and are not shown. 85

10 represents the tender draw-head, and 11 the front draw-head, of the adjacent car, said draw-heads being secured upon the tender and car in the usual manner. 90

12 represents the usual cushion-spring of the car draw-head.

13, Figs. 1 and 1<sup>a</sup>, represents the coupling-hook rods extending through the tender draw-head and having mounted thereon the coupling-hook 14 within the draw-head. 95

15 represents a power-spring arranged or mounted upon the coupling-hook rod within the draw-head, abutting at one end against the cross-head 16 therein. 100

17 represents a collar, and 18 a sleeve, integral therewith, fixedly mounted on said rod, preferably, as shown, by key 19, passing through the sleeve and through the rod.



20 represents a depending perforated lug on the collar 17, connected by the link 21 with the rear brake-lever, the arrangement being such that as the locomotive pulls up the pull  
5 on the coupling will draw the coupling-hook rod through the draw-head and compress the spring between the collar 17 and the cross-head 16, and by the movement of the collar through the link 21 the levers will be oper-  
10 ated and the brakes released or thrown off, and then as the locomotive slacks up, the pull on the coupling being relieved, the expansion of the spring will carry the collar forward and, through the link 21, will operate the  
15 brake-levers and set the brake.

22 represents the perforated depending lug on the sleeve 18, upon which is pivotally mounted a link 23.

24 represents a rock-shaft having its bearing in lugs 25 formed or mounted on the forward end of the draw-head and provided with the crank-arm 26, and the connecting-bar 27, rigidly mounted on said rock-shaft, is at its other end pivotally connected with the  
25 free end of the link 23, forming therewith a toggle, the purpose of which will be noted below.

28 represents a connecting-rod, connected with one end to the crank-arm 26, and extending to the engine-cab is connected to one  
30 arm of the lever 29, the other arm of said lever being within reach of the engineer in the cab. The arrangement of these parts is such that when the pull on the coupling compresses the spring the arms of the toggle will be extended with the moving backward of the sleeve into the position shown in dotted lines in Fig. 3, and being thus extended the spring is locked in its compressed condition and will  
40 not act to set the brake with the slackening of the speed until, through the lever 29, the engineer releases the spring by throwing the arms of the toggle out of line, when the spring will at once act to set the brake.  
45 Thus while the action of the spring to set brakes is purely automatic it is fully under the control of the engineer in the cab. The toggle when extended as shown in dotted line in Fig. 3 also acts as an abutment to receive  
50 the shock of impact due to bumping of the car incident to sudden checking of the speed in locomotive or irregular movement over a rough road.

30, Figs. 2 and 2<sup>a</sup>, represents a coupling-  
55 hook rod extending the entire length of the car. Said rod lies or is carried in the channel or groove 31 in the center sill 32 of the car, being supported and retained therein by the cross-bars 32<sup>a</sup>, bolted upon the sill. Upon  
60 the end of said rod is mounted the coupling-hook 33, arranged to engage the coupling-hook of the tender or adjacent car, as shown in Fig. 4. Within the draw-head and bearing against the coupling-hook on the hook-rod  
65 is loosely mounted the collar 35, arranged to slide longitudinally on said rod. 38 represents a depending perforated lug on said col-

lar, and formed integral with said lug or connected therewith, as shown in Fig. 8, is a link 39, the opposite end of which engages the  
70 long arm of the lever 8 of the rear brake.

40 represents a sleeve mounted on the hook-rod and extending within the draw-head. Immediately within the rear cross-head 41 of the draw-head said sleeve is provided with a  
75 collar 42, and at its rear end is also provided with a collar 43, threaded thereon and having a depending perforated lug 44, to which is connected one end of the link 45, the other end of said link being connected with the  
80 long arm of the lever 7 of the front brake. Said sleeve and collars are loosely sleeved upon and arranged to slide longitudinally on said hook-rod. 47 represents a ring or stop fixedly mounted on said hook-rod beyond the  
85 collar 43 from the draw-head.

48 represents a power-spring mounted on the coupling-rod between the collars 35 and 42. The coupling-hook rod, as above noted, extends the entire length of the car and at  
90 its other end is provided with a coupling-hook, collars, sleeve, power-spring, and connecting-rods connecting the sliding collars with the brake-levers of the rear truck, and, being identical in construction, arrangement,  
95 and mode of operation with the same parts shown and above described, are not shown.

In the operation in the construction above described, the car being coupled to the tender or an adjacent car, so that the draw-head  
100 11 is the forward draw-head and the pull on the coupling in the direction of the arrow A, by the pull on the coupling the coupling-hook rod is drawn forward, and by the ring 47 engaging the collar 43 the sleeve 40 and  
105 the collar 42 are drawn forward and the power-spring is compressed between the collars 32 and 35, said collar 35 having a rigid bearing against the draw-head at the end of the recess 46, in the under side thereof, as the  
110 hook-rod is drawn forward. By this action and the forward movement of the collar 43, the rear brake-lever 8 being held in a fixed position by its link connected with the rigidly-held collar 35, the front brake-lever is  
115 operated by its link, connected with the collar 43, to release the brake, and then when the speed of the engine is slackened or on a downgrade as the pull on the coupling-hook rod is released the expansion of the power-  
120 spring against the collar 42 will carry the sleeve and collar 43 backward and, through the link 45, will apply or set the brakes, to be again released as the slack between the cars is taken up and the pull on the coupling-  
125 hook rod applied as before. If, however, the car is reversed and the coupling to the tender or adjacent car so made that the opposite end of the car becomes the forward end and the pull on the coupling-hook rod is in the  
130 direction of the arrow B, the collar 35 will be drawn longitudinally by the action of said rod and the spring compressed against the collar 42, which will have a rigid bearing



against the rear cross-head 41, holding rigidly through its sleeve and the collar 43 the brake-lever 7, which, in such relation will become the rear brake-lever, will be held in a fixed position by the link 45, and the brakes released by the link 39, connected to the acting collar 35, and, again, on slacking speed or on downgrade when the pull on the coupling-hook rod is released the expansion of the spring will move the collar 35 longitudinally and, through the link 39, will apply or set the brake, it being borne in mind that the coupling-hook rod extends the entire length of the car and at its opposite end is provided with the identical construction operating in the identical manner described to apply and release the brakes of the other truck and also that each car of the train being provided with like devices a continuous coupling is performed throughout the train acting automatically and at once, when from any cause a slack occurs between the cars, to apply or set the brakes of the whole train or of any particular car where the slack may occur, and here will be remarked one of the leading advantages in my coupling-brake system, in that if a car becomes detached from the train or a break occur in the train, the pull on the coupling-hook rod ceasing, the power-springs will at once expand and the brakes on the car or cars detached will be applied and the cars at once stopped, thus, it may be, preventing serious accident and wreck. The advantage important to be observed of the arrangement of the collars and mounting them loosely upon the coupling-hook rod is in that by so mounting they are adapted in their action with the power-spring to counterbalance or counteract the effect of the action of the cushion-spring of the draw-head in backing or when the draw-heads bump together on a sudden stop or start on a rough road. It will be observed that when the draw-head 10 of the tender presses against the draw-head 11 of the car in backing or bumps against it in a sudden stop the cushion-spring will yield and the draw-head be carried back under the car, thus carrying the collar 35 back therewith, the effect being to act upon the lever of the rear brake and release the brakes or throw them out of their proper coöperative relations; but the collar being loose on the coupling-rod and the collar 43 and sleeve 40 being also loose as said collar 35 is pushed back by the action of the draw-head the collar 43 will by the action of the power-springs be also pushed back, sliding on the coupling-rod, and thus as the consequent relation is maintained between the collars 35 and 42 the brake-lever 7, operated by the collar 43, will be drawn back to the same extent as is the brake-lever 8, and the proper relations of the brake to the wheels maintained.

Another very important advantage derived from the use of power-springs as arranged in the draw-head and the continuous coupling-rods in my coupling-brake system is the re-

lief from a shock incident to the bumping of the draw-head upon sudden stops or starts afforded to the cars and draw-heads. In the ordinary and usual arrangement in the systems now used when a sudden stop or start is made the draw-heads will bump together with terrific force, overcoming with the sudden crash the resistance of the cushion-spring, and at times almost sufficient to splinter the car, the effect being the destruction of the draw-head or its mountings on the car and serious damage. In the arrangement of the power-spring and continuous coupling-rod in my coupling-brake it will be observed that in the case of a sudden stop or start or in backing as the draw-heads come together the force of the concussion is first taken up by the coupling-hook, the ends of each being seated in a pocket 70 of the opposing hook, and the coupling-hook of the tender being thrust back and locked by the action of the toggle in the position shown in Fig. 3 in dotted lines, the effect is that this force will act upon the power-spring before the draw-heads come together, thus breaking the force of the initial blow on the draw-heads and the consequent severe and sudden bumps and shock to the car, and, further, the coupling-rods of the several cars by the close union of the coupling-hooks forming a substantially continuous unbroken connection throughout the train, the force exerted upon the coupling-hook of the forward car or the car where the bump occurs will be distributed along said continuous coupling-rod throughout the whole train, and thus the disagreeable and disastrous shock and damage to the car and breaking of draw-heads and other parts are relieved and avoided. I am aware that in the air-brake system there is arrangement made whereby the brakes on such detached cars may be applied through the action of the auxiliary reservoir under each car; but with that system a leaky air-pipe or a defective valve may render the whole apparatus useless and fail at the critical time to avert disaster, while with my system there are no pipes to leak and no valves to fail to act, thus insuring a certainty of action not found in the air-brake.

When it is desired to make use of the brakes in switching the cars, I provide as follows: On the coupling-hook rod between the spring and the collar 42 is loosely mounted a ring 49, on which is carried an arm 50, provided at its extremity with a hook 51. In the perforated lug 38 is mounted one end of a rocking lever 52, on the arm 53 of which is provided a hook 54, and said hooks 51 and 54 are so arranged that when the power-spring is compressed between the collars said hooks will engage one with the other and lock the spring, so that when the pull on the coupling-hook rod is relieved the spring is held from expansion to operate and apply the brakes by such engagement of the hooks. The other end of said rocking lever 52 is mounted in the swinging bracket 55, carried on the arm



56, extending beyond the end of the car, and at the side of the car said lever is provided with a crank-arm 56<sup>a</sup> for operating the lever. 57 represents a tension-spring mounted on said rocking lever. 58 represents a step formed on the brake-link 39 and arranged to support the hook-arm of the lever, and the hook 54 thereon is thereby held ready to engage with the hook 51 and lock the power-spring when it is desired to set the same for switching purposes. When a car is to be cut out of the train and switched while the power-spring is compressed under the pull on the coupling-hook rod by the rocking lever, the hook 54 is set up on the step 58 and the switch-hooks 51 and 54 brought into engagement, said hook 54 being retained upon the step and in engagement with hook 51 by the action of the tension-spring 57 until the car cut out moves to the point at which it is to be set down and stopped, when by a thrust on the crank-arm of the lever the hook 54 is thrown from the step and out of engagement with hook 51 and the power-spring is released and the brakes set and the car stopped. I also provide a lever 59, mounted on the bottom of the car, having one arm connected by the link 60 with a perforated lug 61 on the brake-link 39, and on its other arm a link 62, connecting to the usual hand brake mechanism, which, being of well-known and familiar construction, is not shown, so that when it is desired or necessary the brakes may be released by the hand brake mechanism, to be again applied by the expansion of the power-spring. When the coupling is made, the coupling-hooks are held in engagement by the springs 63, mounted within the draw-heads, and the springs 64, carried on the rings 65, mounted on the coupling-rods immediately adjacent to the body of the coupling-hook.

The coupling-hooks are formed with a body portion 66 and a head 67, having on one side a recess 68, forming the hook 69, and are mounted upon the coupling-hook rods by threading thereon, as shown in Fig. 9, the point or end of the hook where the coupling is made being seated in the pocket 70 of the opposing hook.

Having thus fully described the mechanism and operation of my coupling-brake system, what I claim as my invention, and desire to secure by Letters Patent, is—

1. A coupling-brake consisting of the combination with the brake mechanism of a draw-head, secured to the body of the tender, having a cross-head near its open end, a coupling-hook rod extending through said draw-head, a coupling-hook mounted on said rod, a collar mounted on said rod within said draw-head, a power-spring arranged on said rod between said collar and said cross-head, and a link connecting said collar with the brake mechanism, substantially as set forth.

2. A coupling-brake consisting of the combination with the brake mechanism of a draw-

head, secured to the body of the tender, and having a cross-head near its open end, a coupling-hook rod extending through said draw-head, a coupling-hook mounted on said rod, a collar mounted on said rod and secured thereon by a key passing through said rod, a depending perforated lug on said collar, a link connecting said lug with the brake mechanism, and the power-spring arranged on said rod, between said collar and said cross-head, whereby the pull and slack of the train on the coupling will operate the release, and apply the brakes, substantially as set forth.

3. In a coupling-brake the combination with a draw-head secured to the body of the car, and leaving the cross-head near its open end, a coupling-hook rod mounted in said draw-head, a coupling-hook mounted on said rod, a collar mounted on said rod in the draw-head, a power-spring arranged on said rod between said collar, and said cross-head, a sleeve on said collar provided with a depending perforated lug, a link connected with said lug, a rock-shaft provided with a crank-arm mounted on the draw-head, a bar secured upon said rock-shaft connecting with said link, and a rod connected with said crank-arm, and with a lever in the engine-cab, substantially as and for the purpose set forth.

4. In a coupling-brake the combination with the brake mechanism, a draw-head, having a cross-head near its open end, a coupling-hook rod extending through and arranged to slide longitudinally in said draw-head, and a coupling-hook mounted on said rod; of a collar fixedly mounted on said rod within the draw-head, a power-spring arranged upon said rod, between said collar and said cross-head, and a link connecting said collar with the brake mechanism, substantially as set forth.

5. In a coupling-brake the combination with the brake mechanism, the draw-head, the coupling-hook rod extending through, and arranged to slide longitudinally in the draw-head, and a coupling-hook mounted on said rod, of a collar fixedly mounted on said rod, a sleeve on said collar provided with a depending perforated lug, a rock-shaft mounted on said draw-head, a toggle connected with said shaft and with said lug, and a link connecting said collar with the brake mechanism; substantially as and for the purpose set forth.

6. A coupling-brake consisting of the combination with the brake mechanism, and a draw-head having a cross-head at its inner end, of a coupling-hook rod provided with coupling-hooks, extending longitudinally under the car, a forward collar mounted on said rod, arranged to bear against the head of the coupling-hook, a collar mounted on said rod within the draw-head arranged to bear against said cross-head of the draw-head, an external collar mounted on said rod, connected with said internal rear collar, a power-spring mounted on said rod between said col-



lars within the draw-head, and links connecting said forward collar, and said external rear collar with the brake mechanism, substantially as set forth.

5 7. A coupling-brake consisting of the combination with the brake mechanism, and a draw-head of a coupling-hook rod, provided with coupling-hooks at its end, arranged to slide longitudinally through the draw-head, 10 a collar mounted on said rod within the draw-head, an external collar mounted on said rod connected with said internal collar, a power-spring mounted within the draw-head, having a fixed bearing at its forward end, and arranged to be compressed by said internal collar upon a pull upon the coupling, and a link 15 connecting said external collar with the brake mechanism, substantially as set forth.

8. In a coupling-brake the combination 20 with the draw-head, and the coupling-hook rod, arranged to slide longitudinally through said draw-head, and provided with coupling-hooks at its ends, a collar mounted on said rod within the draw-head, a collar mounted 25 on said rod to the rear of the draw-head, connected by a sleeve with said internal collar, and ring fixedly mounted on said rod, and arranged to bear against said external collar upon a pull upon said coupling-rod, substantially as set forth. 30

9. The combination with the brake mechanism and a car-coupling consisting of a coupling-rod extending the length of the car, and provided with coupling-hooks on its ends, of 35 a sleeve loosely mounted on said rod, and provided with collars at its ends, a link connecting one of said collars with the brake mechanism, a power-spring mounted on said coupling-rod and arranged to bear against 40 one of said collars to control and operate the brakes; and a ring fixedly mounted on said rod, cooperating with said collars and sleeves, substantially as set forth.

10. The combination with the brake mechanism and a car-coupling, consisting of a coupling-rod extending the length of the car, and provided with coupling-hooks at its end, of a collar loosely mounted on said rod, adjacent to the coupling-hook head, and a link connecting 45 said collar with the brake mechanism, and a power-spring mounted on said coupling-rod and arranged to bear against said collar to control and operate the brakes; substantially as and for the purpose set forth. 50

11. The combination with the draw-heads of a railroad-car, and a car-coupling consisting of a coupling-rod, extending the length of the car, provided with coupling-hooks at its ends, and arranged to slide longitudinally 55 through the draw-heads, of a collar loosely mounted on said rod, adjacent to the coupling-hook heads, a brake-link connected with said collar, a collar loosely mounted on said rod within the draw-head, at its rear end, an 60 external collar on said rod, connected with said internal collar, a ring fixed on said rod adjacent to said external collar, a brake-link

connected with said external collar, and a power-spring arranged on said rod, between said internal collars, substantially as and for 70 the purpose set forth.

12. In a coupling-brake, the combination with a draw-head, a coupling-rod provided with coupling-hooks at its end, a collar loosely mounted on said rod, within the inner end 75 of the draw-head, a sleeve on said collar extending beyond the draw-head, a fixed stop on said rod to limit the movement of said sleeve thereon, a brake-link connected with said sleeve, a collar loosely mounted on said 80 rod, adjacent to, the coupling-hook head, and provided with a depending perforated lug, an underhanging step on said lug, brake-link connected with said collar, and a power-spring arranged on said rod between said col- 85 lars, of a ring on said rod adjacent to said rear inner collar, a forwardly-extending hook, on said ring, a rocking lever mounted in said perforated lug, and in a hanging bracket at the side of the car, a bell-crank on said rock- 90 ing lever, arranged to be seated on said step, a hook on said bell-crank, arranged to be engaged by said rear hook, when the power-spring is compressed, a tension-spring on said lever to retain said bell-crank on said shelf 95 and an arm on said lever for operating the same, substantially as set forth.

13. In a coupling-brake the combination with a coupling-rod, provided with a coupling-hook at its end, and a power-spring arranged upon said rod, of a collar on said rod 100 at one end of said spring provided with a depending perforated lug, an underhanging step on said lug, a rocking lever mounted at one end in said lug and at its other end in a 105 hanging bracket at the side of the car, a bell-crank on said lever, provided with a hook, and arranged to be seated on said step, a tension-spring on said lever to retain said bell-crank in its seat, means for operating said 110 lever, a ring on said rod at the other end of the spring, and a forwardly-extending hook on said ring, arranged to engage said bell-crank hook to lock said spring under compression, substantially as set forth. 115

14. In a coupling-brake a coupling-rod extending under the car, and provided with a coupling-hook at its end, a collar on said rod provided with a depending perforated lug, an underhanging step on said lug, a rocking 120 lever mounted at one end in said lug, and at its other end in a hanging bracket at the side of the car, a bell-crank on said lever, provided with a hook, and arranged to be seated on said step, a tension-spring on said lever 125 to retain said bell-crank on its seat, and means for operating said lever, in combination with the brake mechanism, a link connecting said collar with the brake mechanism, and a power-spring mounted on said 130 coupling-rod and bearing against said collar for controlling and operating the brakes; substantially as set forth.

15. In a coupling-brake the combination



with the brake mechanism, the draw-head of a coupling-rod provided with a coupling-hook at its end, arranged to operate in the draw-head, of collars loosely mounted on said rod  
5 connected each independently with the brake mechanism, a power-spring mounted on said rod between said collars, and arranged to be compressed between the same, and by its expansion to set the brakes, and a ring fixedly  
10 mounted on said coupling-rod and arranged to operate one of said collars to compress the spring in one direction; substantially as set forth.

16. In a coupling-brake the combination  
15 with the brake mechanism, the draw-head, and a coupling-rod, provided with a coupling-

hook on its end, arranged to operate in the draw-head, of a collar on said rod, a link connecting said collar with the brake mechanism, a power-spring on said rod, bearing 20 against said collar, and arranged by its expansion to set the brakes, and a hand brake-lever pivotally mounted on the under side of the car, connected with said link, and with hand brake mechanism, to compress the 25 spring, and release the brake, substantially as set forth.

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Witnesses:

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