

No. 811,863.

PATENTED FEB. 6, 1906.

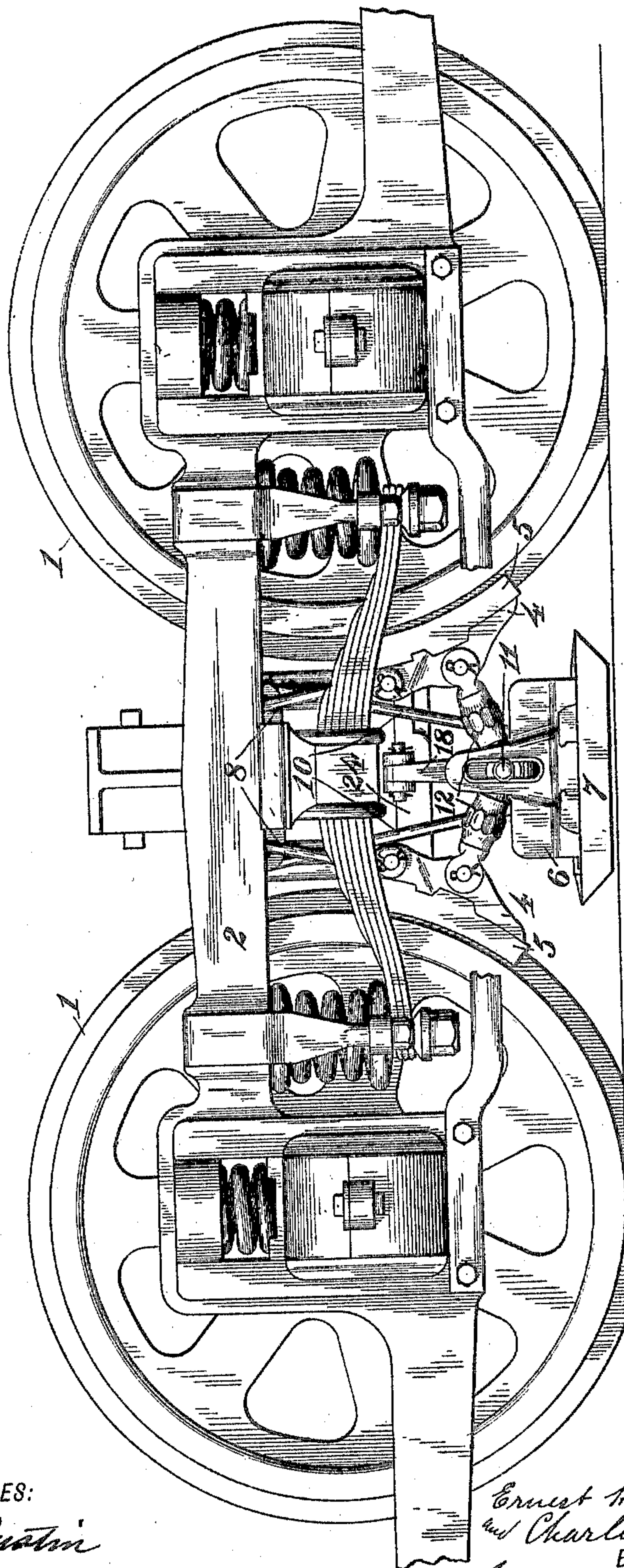
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AIR BRAKE.

APPLICATION FILED JULY 21, 1904.

6 SHEETS—SHEET 1.

Fig. 1.



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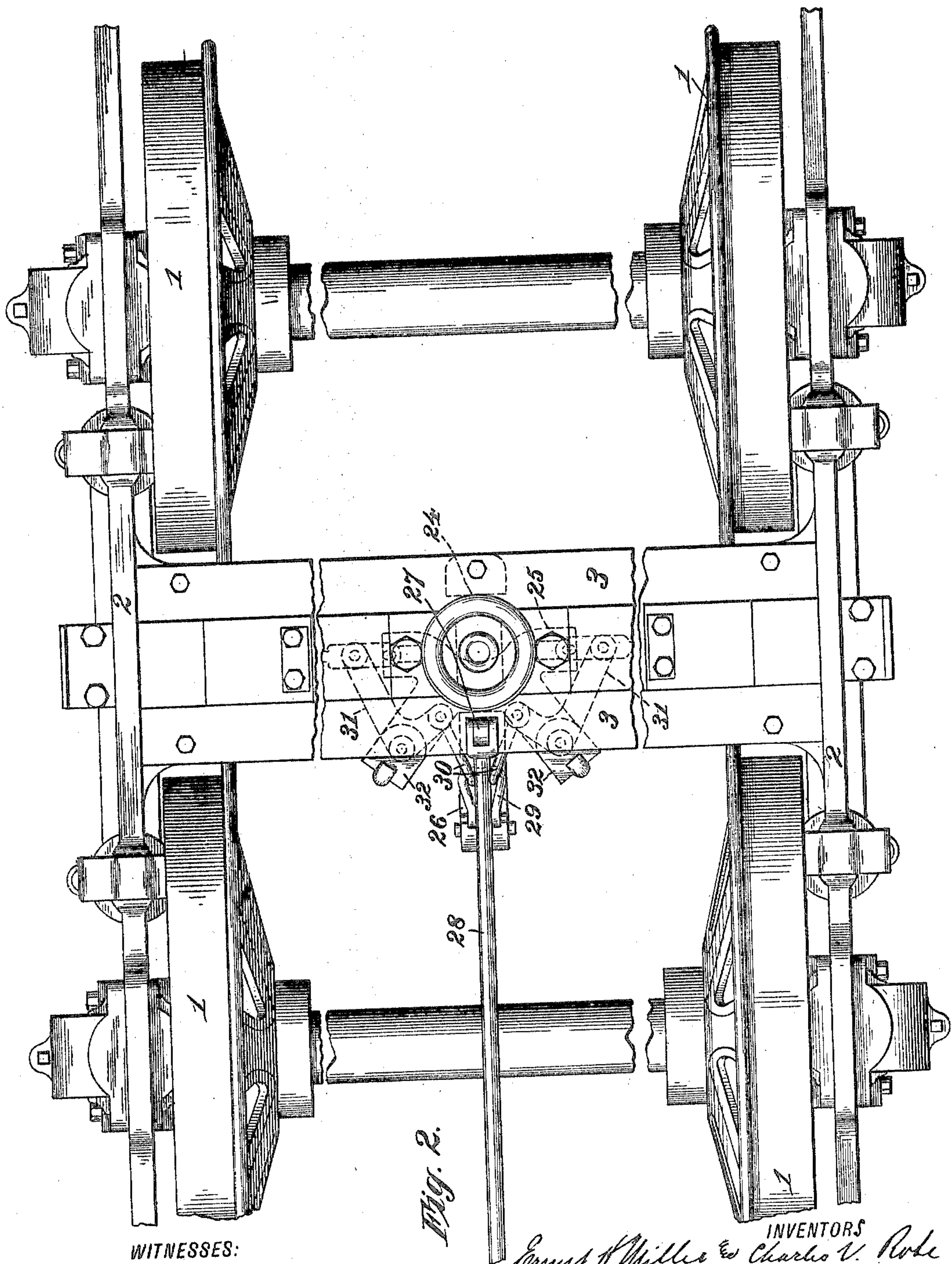
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6 SHEETS—SHEET 2.



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Fig. 2.

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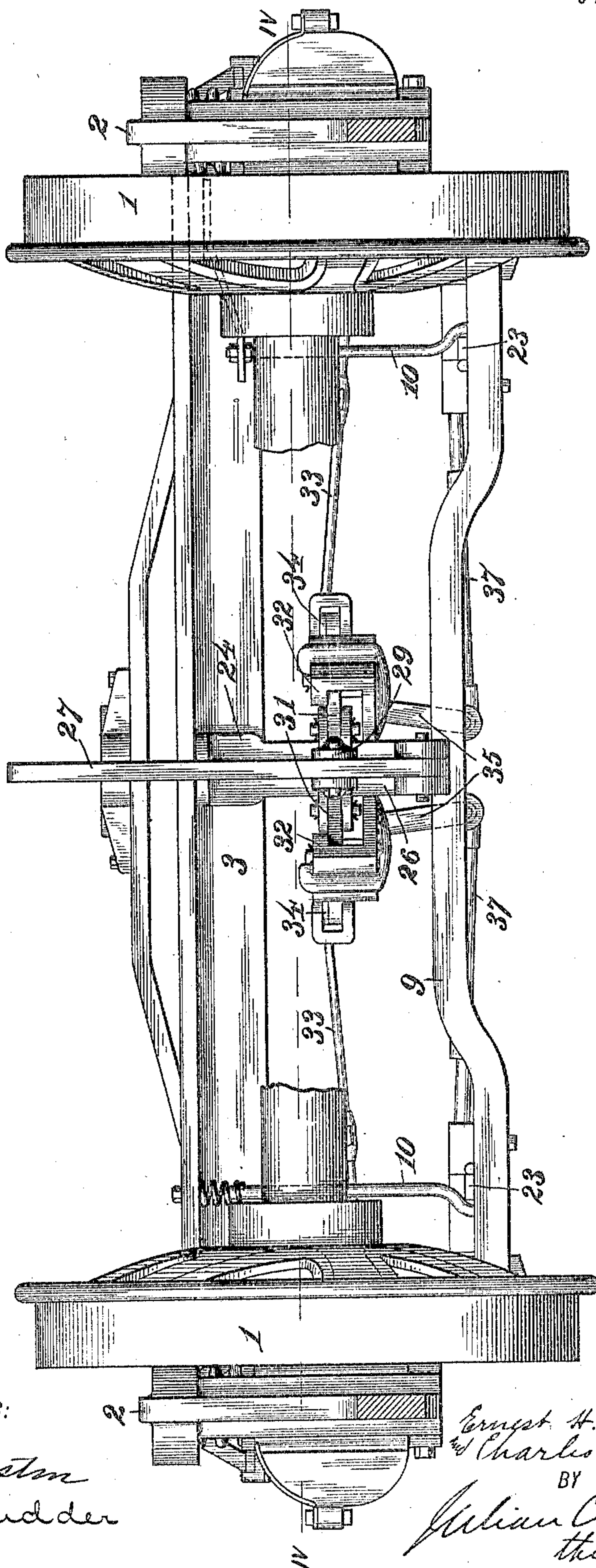
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6 SHEETS—SHEET 3.

Fig. 3.



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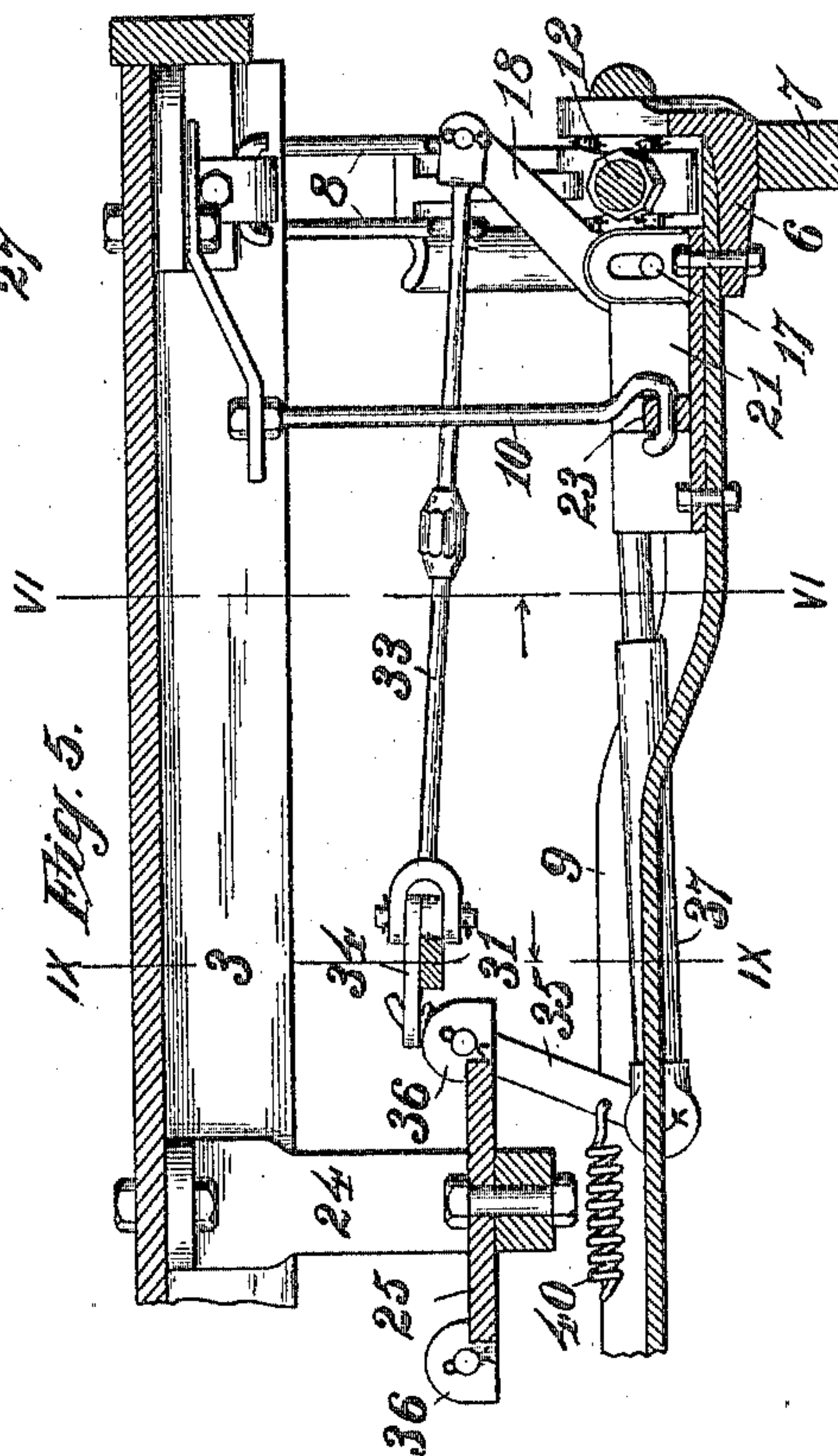
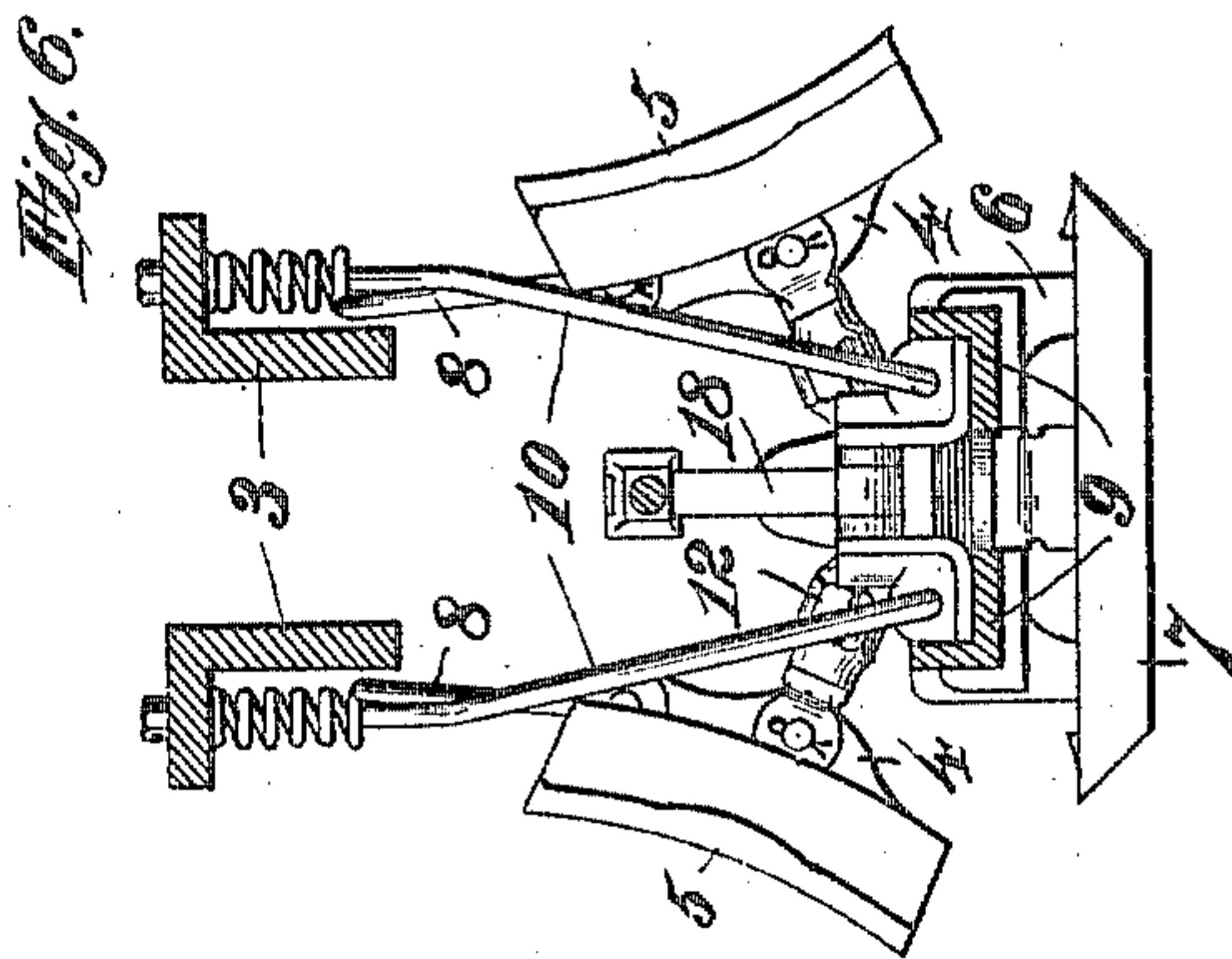
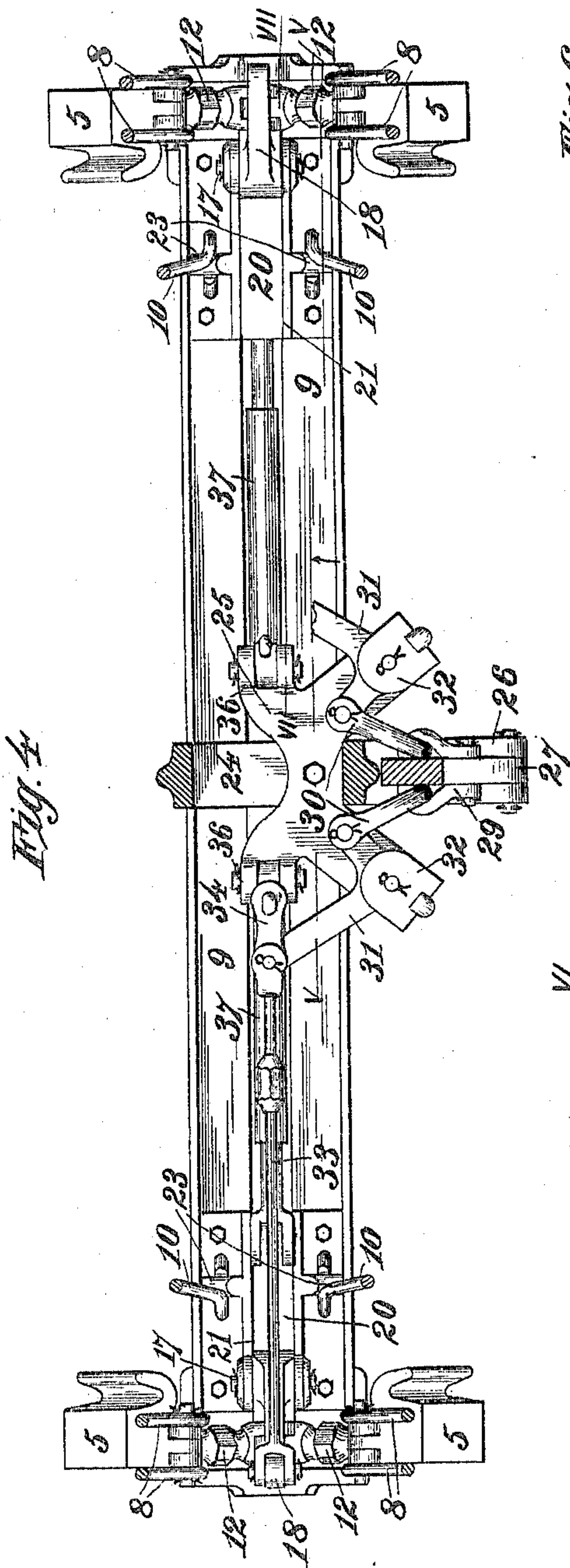
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6 SHEETS—SHEET 4.



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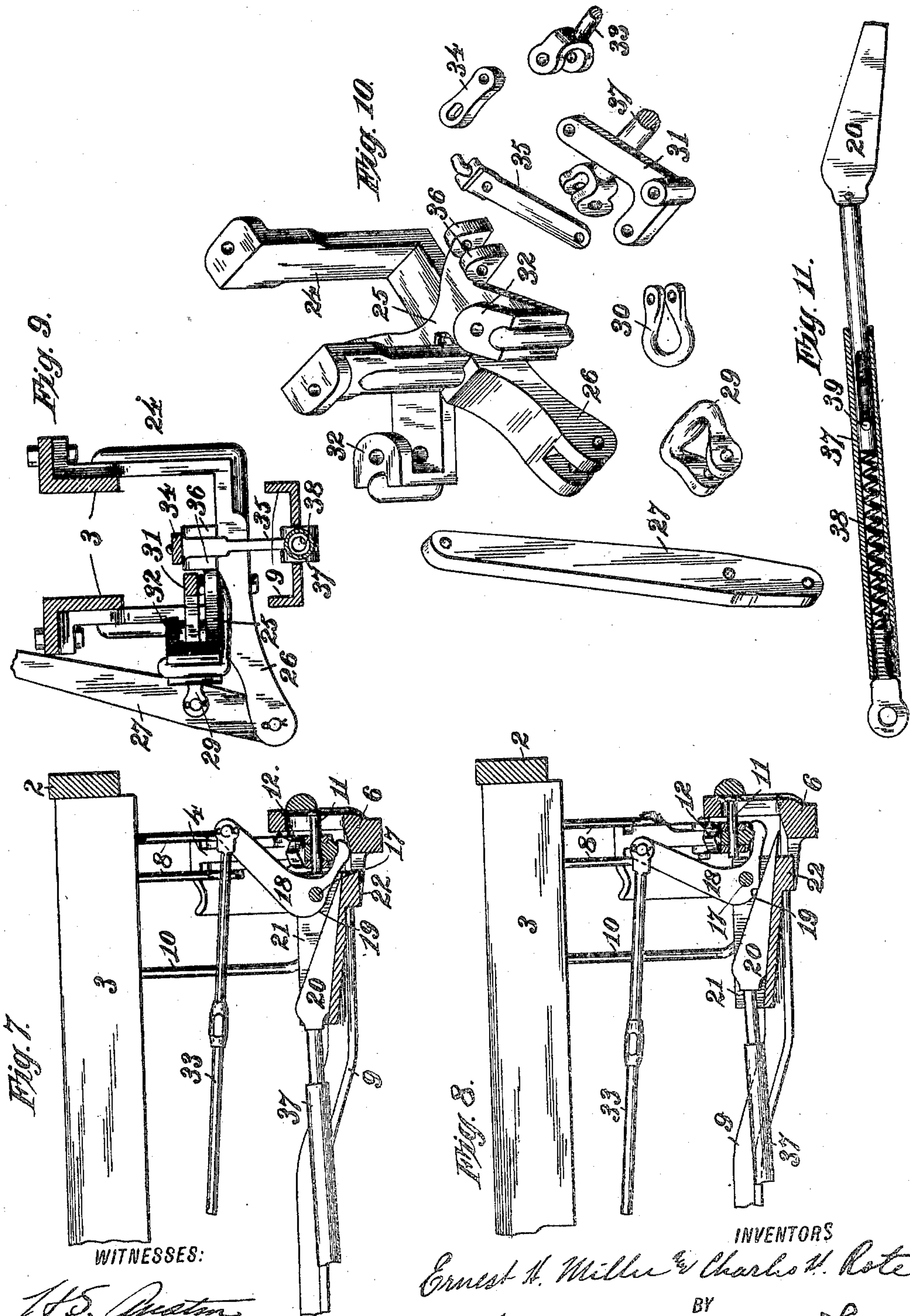
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6 SHEETS—SHEET 5.



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6 SHEETS—SHEET 6.

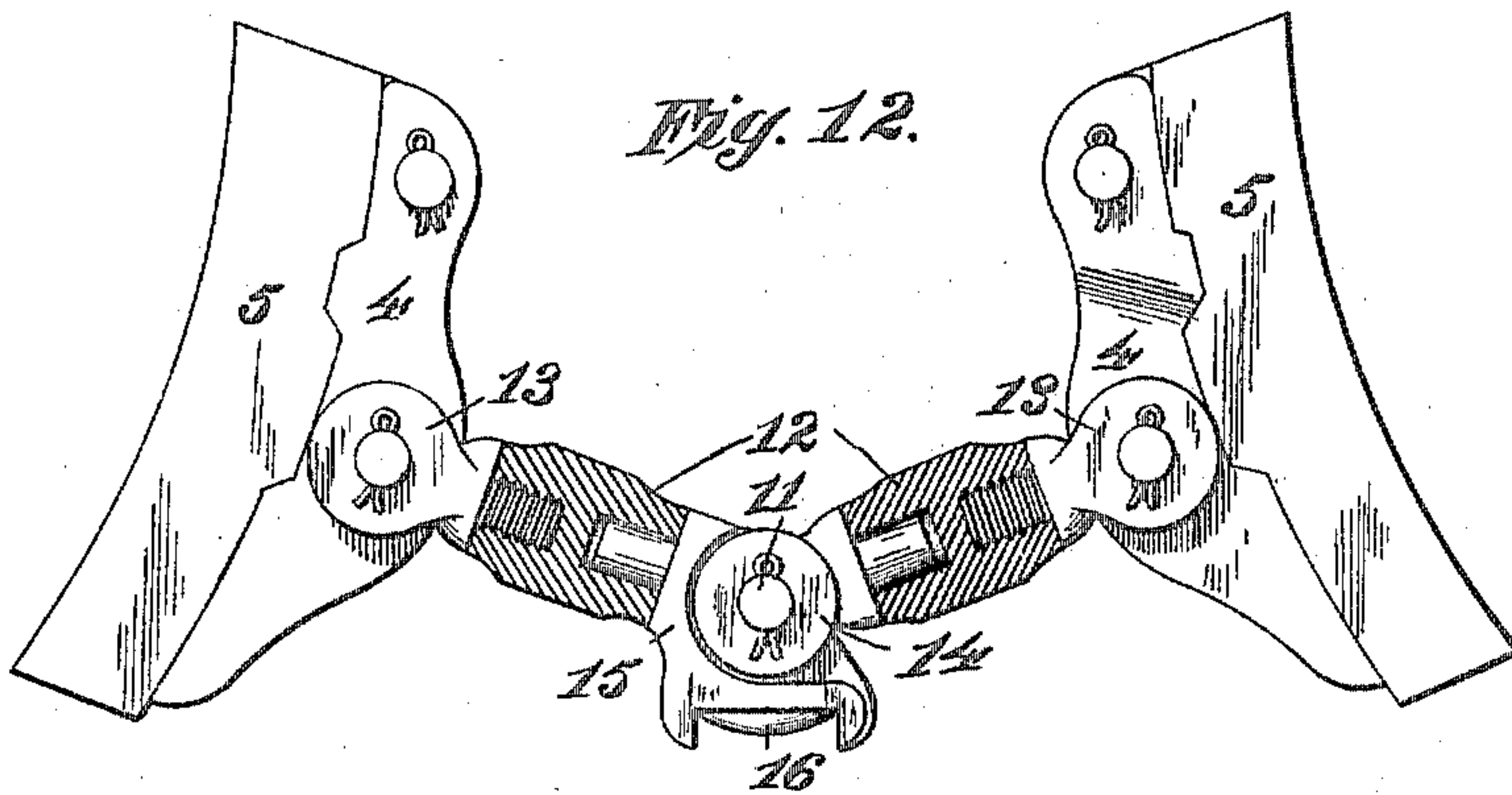


Fig. 13.

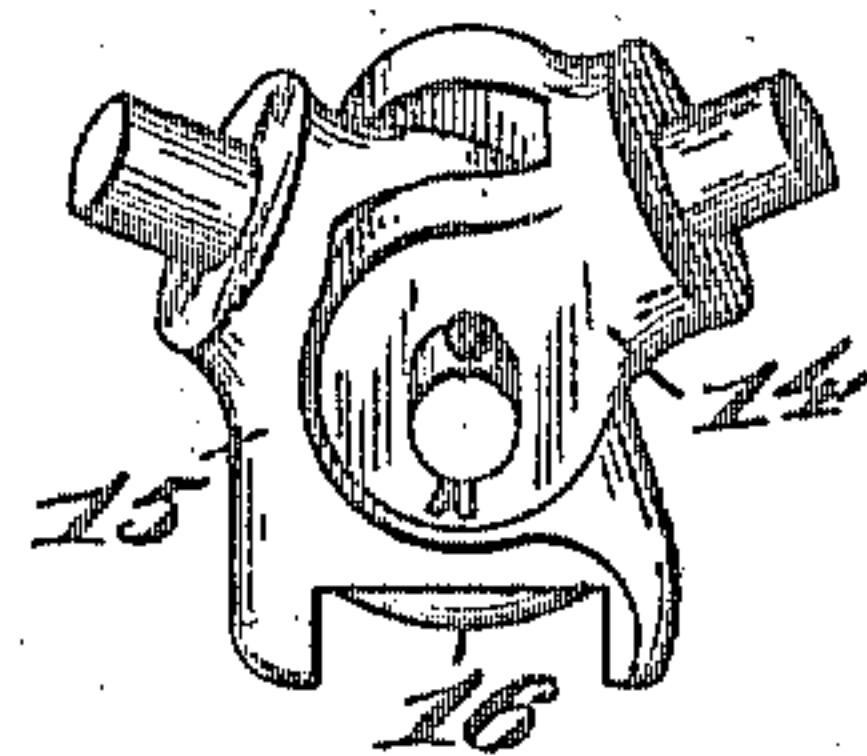


Fig. 14.

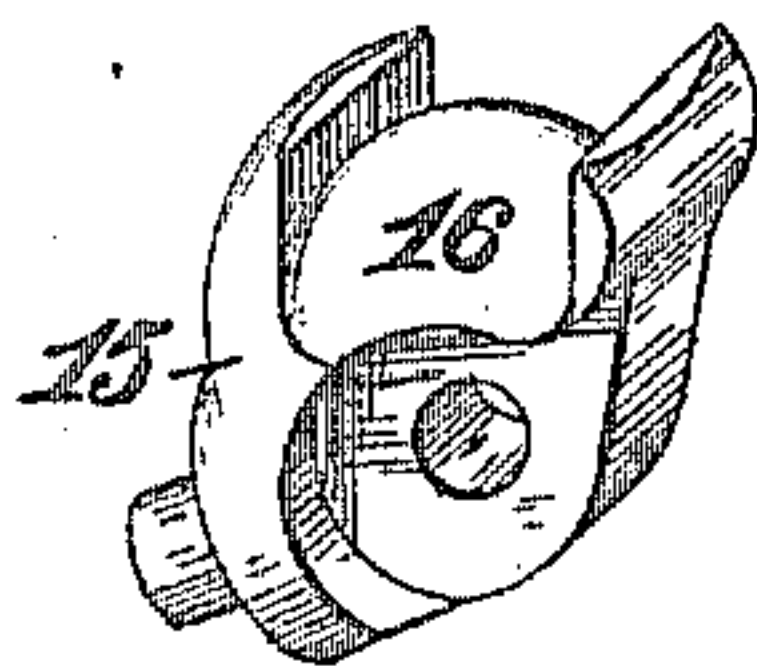


Fig. 15.

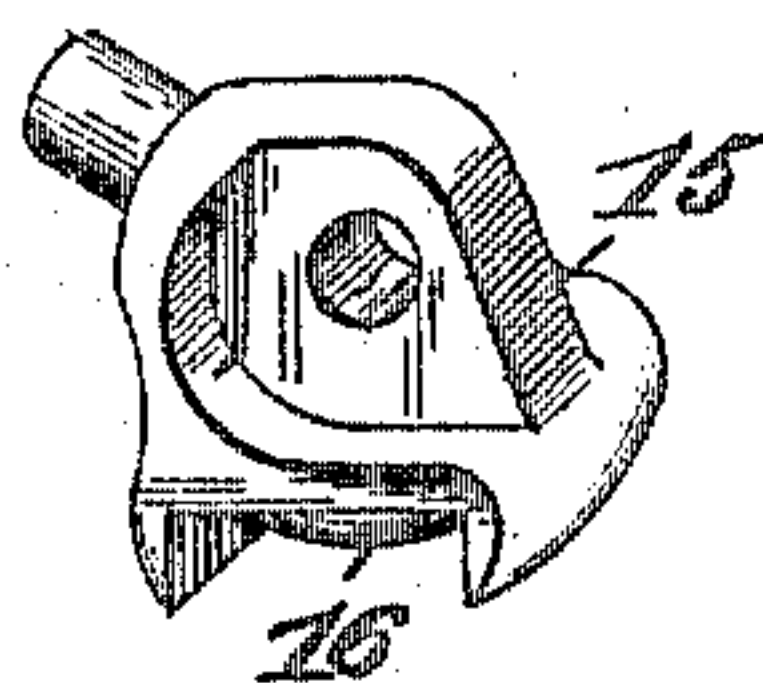


Fig. 16.

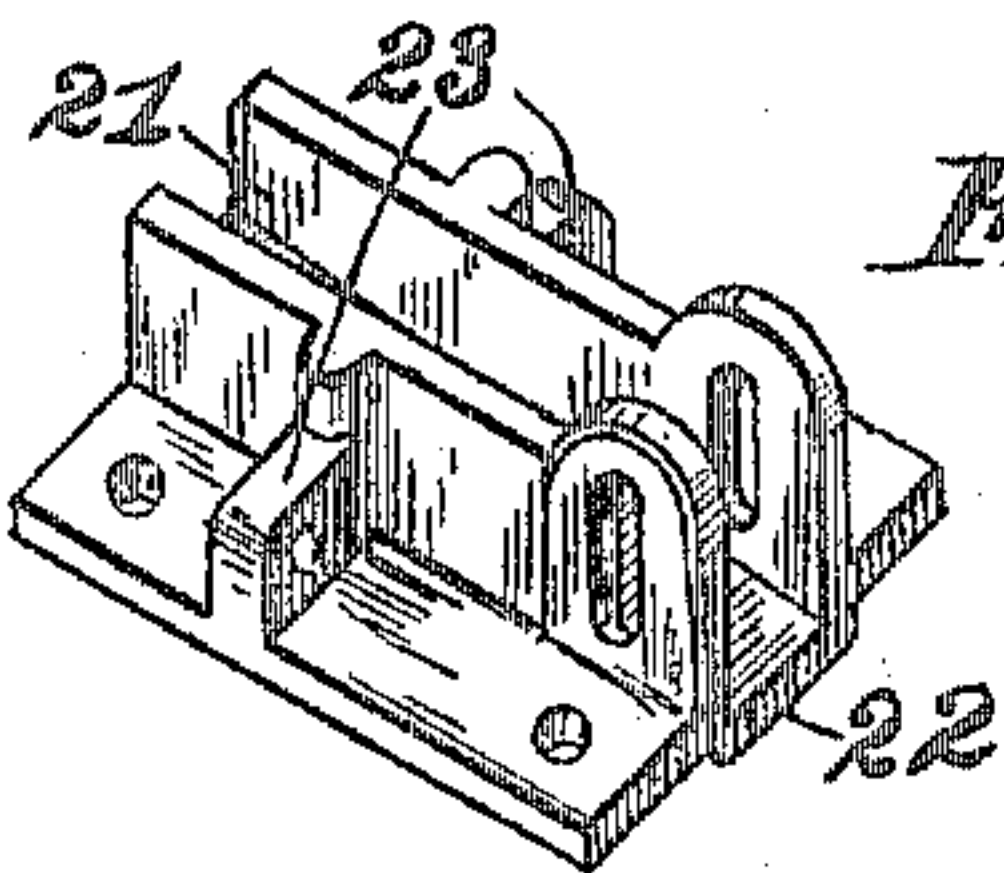
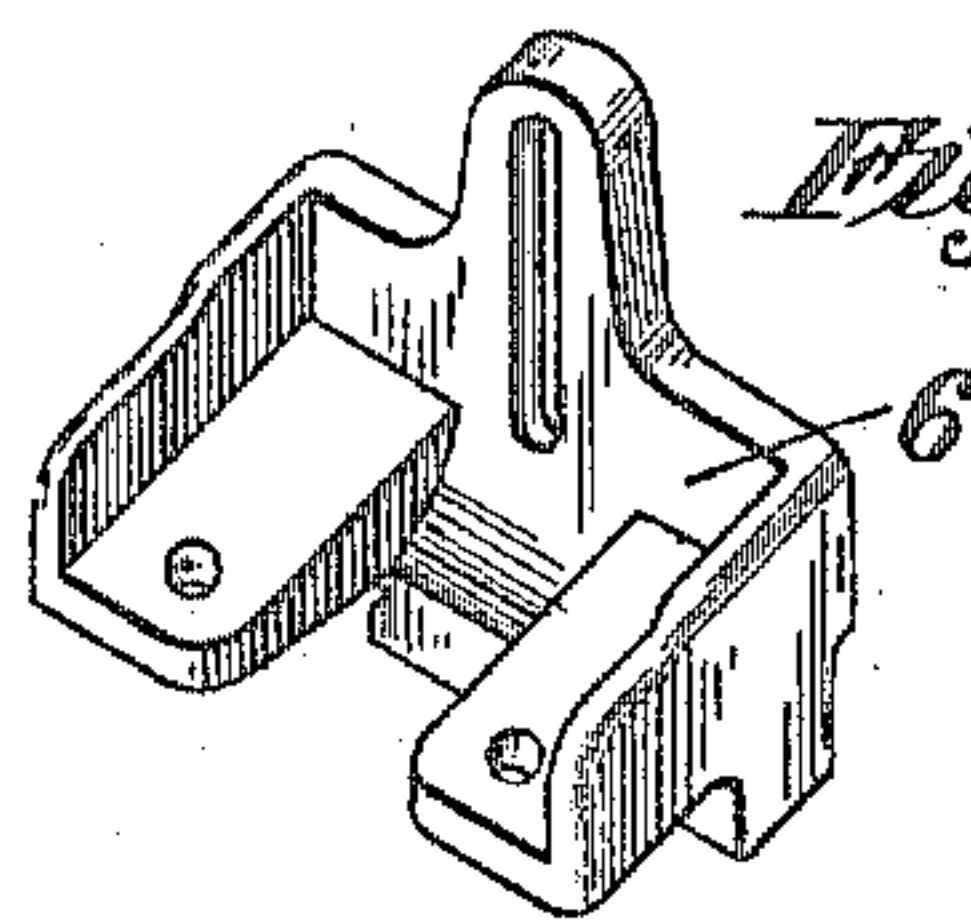


Fig. 17.

Fig. 18.

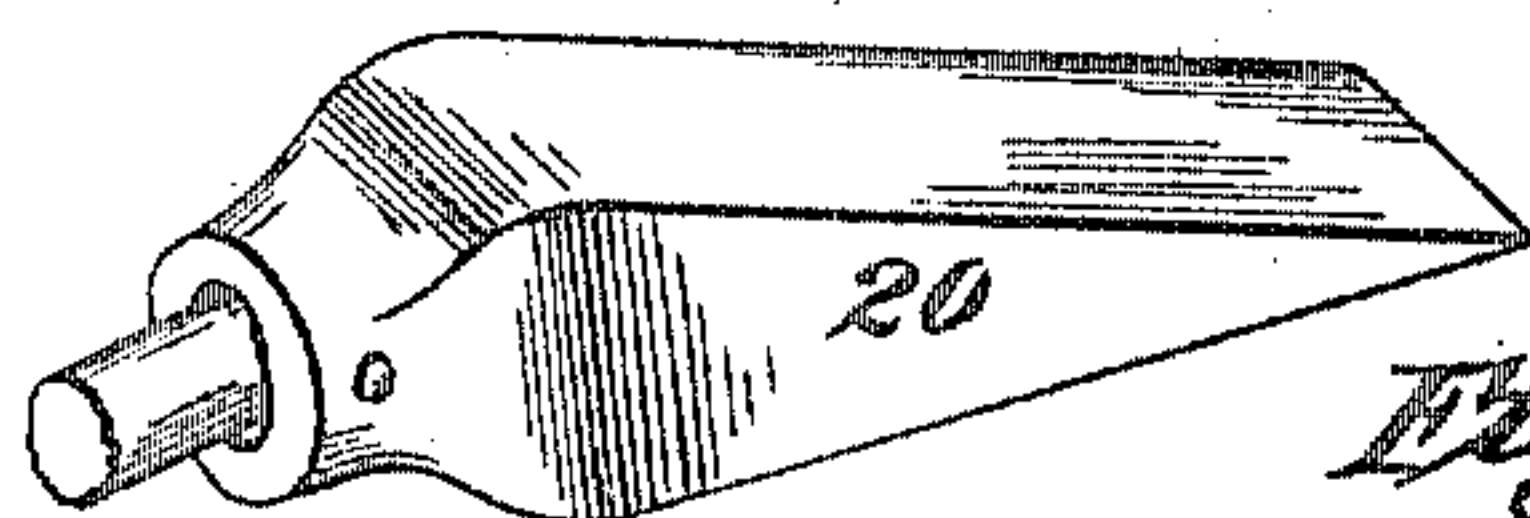
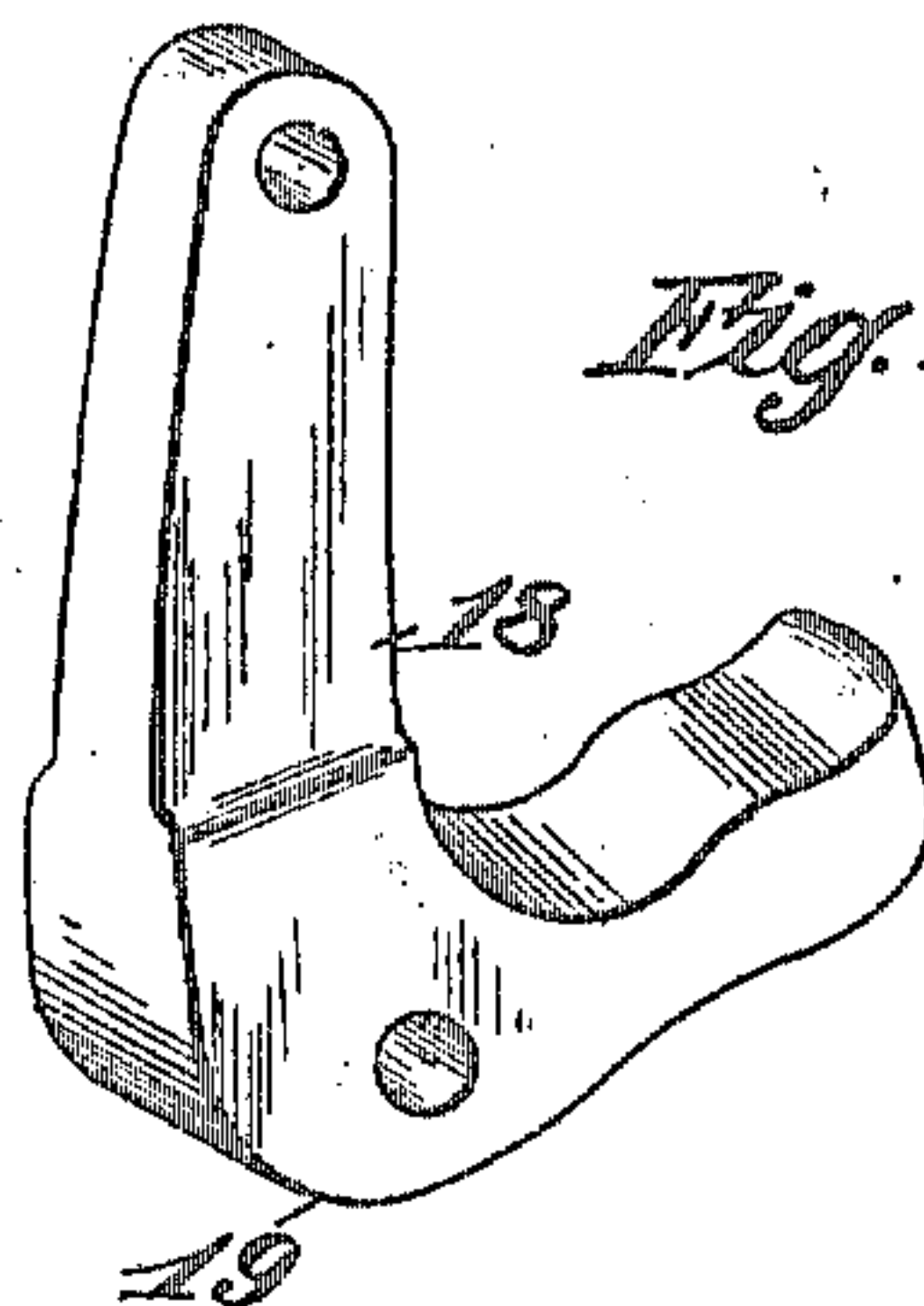


Fig. 19.

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UNITED STATES PATENT OFFICE.

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AIR-BRAKE.

No. 811,863.

Specification of Letters Patent.

Patented Feb. 6, 1906.

Application filed July 21, 1904. Serial No. 217,476.

To all whom it may concern:

Be it known that we, ERNEST HOLMAN MILLER and CHARLES VICTOR ROTE, citizens of the United States, residing at Lancaster, in the county of Lancaster and State of Pennsylvania, have invented certain new and useful Improvements in Car-Brakes; and we 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.

Our invention relates particularly to combined wheel and rail brakes wherein brake-shoes are applied to both the car-wheels and the track-rails. Certain features, however, are susceptible of general utilization and are applicable either to wheel-brakes or rail-brakes alone.

The principal objects are, first, to provide a simple, compact, and effective combination of wheel and rail brakes operated by the same lever and so connected that force applied to one brake-shoe will react upon the others, thus increasing the frictional resistance, equalizing forces and strains, and utilizing the power to the best advantage; second, to provide improved brake-actuating mechanism compactly arranged and operating transversely of the track, such mechanism being well adapted for location between the axles of a car-truck having closely-disposed pairs of wheels; third, to maintain the rail-brake shoe a sufficient distance above the rail to clear all projections, uneven rail-joints, or other obstructions and at the same time to apply the brake by a quick action and short motion; fourth, to provide improved means for automatically taking up the wear of the brake-shoes by a compensatory movement in the brake-actuating mechanism.

In the accompanying drawings, which are to be taken as a part of this specification, the invention is represented embodied in a car-truck having two wheel-brake shoes and a rail-brake shoe arranged between the two wheels at each side, each pair of wheel-brakes and its companion rail-brake being operated by the same brake-lever working transversely of the rail and both brake-levers being actuated from a central brake-actuating mechanism. Such a construction is preferred for various advantages, such as compactness of ar-

rangement and equalization and reaction of forces exerted against the rail and wheels at opposite sides of the truck, though the invention is not essentially limited thereto, but is capable of other embodiments, as well as modifications in construction and arrangement.

Without limiting ourselves, therefore, to the particular construction illustrated, the invention will be fully described with reference to the drawings and then defined in the annexed claims.

In said drawings, Figure 1 is a side elevation of the car-truck having attached thereto a combined wheel and rail brake embodying our invention. Fig. 2 is a top plan view thereof. Fig. 3 is an end elevation of the same seen from the left-hand end of Figs. 1 and 2 and with the axle broken away between the wheels. Fig. 4 is a horizontal section on line IV IV of Fig. 3 of the parts located between the car-axles, showing the brakes and actuating mechanism principally in top plan view, but with parts broken away. Fig. 5 is an enlarged detail vertical section on line V V of Fig. 4 looking in the direction of the arrow. Fig. 6 is a vertical section on line VI VI of Fig. 5 looking toward the right, as indicated by the arrow. Fig. 7 is a detail vertical section on line VII VII of Fig. 4 looking in the direction of the arrow and showing the parts in normal position. Fig. 8 is a view similar to Fig. 7, but showing the mechanism in position to apply the brakes. Fig. 9 is a detail vertical section on line IX IX of Fig. 5 looking to the left, as indicated by the arrow. Fig. 10 is a perspective view of the central lever, hanger, spider, and connected parts shown detached or unassembled. Fig. 11 is a detail view, principally in longitudinal section, of the telescopic rod connecting the central mechanism with the take-up wedge. Fig. 12 is a detail view of the wheel-brake blocks and shoes and their connecting toggle, the arms of the toggle being shown in longitudinal section. Fig. 13 is a perspective view of the knuckle of the toggle. Figs. 14 and 15 are bottom and top perspective views of the knuckle-block. Fig. 16 is a detail view of the rail-brake block. Fig. 17 is a detail view of the guideway for the wedge. Fig. 18 is a detail view of the brake-lever. Fig. 19 is a detail view of the take-up wedge.

Referring by specific reference-numerals to the illustrated construction, 1 indicates the car-wheels, and 2 denotes the car-truck, whose upper sides are medially connected by transverse bars 3. Between the two wheels at each side of the truck are two brake-blocks 4, carrying wheel-brake shoes 5, and an interposed lower brake-block 6, carrying a rail-brake shoe 7. The wheel-brake blocks 4 are upheld by hangers 8, depending from the transverse bars 3. The rail-brake blocks 6 at opposite sides of the truck are rigidly connected by transverse angle-beams 9, which are upheld by spring-hangers 10, also depending from the bars 3, to which they may be attached either by plate-springs, as at the right of Fig. 3, or by spiral springs, as at the left of that figure. Each rail-brake block, one of which is shown in detail in Fig. 16, has L-shaped projections on its inner side to receive the ends of the angle-beams 9, which are fitted and bolted therein, as shown in Figs. 5 and 6, said angle-beams being disposed with their horizontal flanges downward and toward each other, but separated, thus forming a channeled beam extending from one rail-brake block to the other.

As the construction of the brakes at each side of the truck is the same, the following description of one set will suffice. Each pair of wheel-brake blocks 4 is connected by a toggle 12, whose central knuckle-pin 11 passes through a vertical slot in the rail-brake block 6. As shown in Fig. 12, the arms 12 of said toggle are provided with turnbuckles, whose upper ends have internally-threaded sockets to receive the threaded stems of jaws 13, pivotally embracing the backs of the wheel-brake blocks 4, while their lower ends have plain sockets engaged by plain stems projecting from the elbow members 14 and 15. One of said members 14 has a jaw pivotally embracing a tenon on the other member, 15, which is a knuckle-block, and has a curved lower bearing 16, formed between depending side flanges. (See Figs. 13, 14, and 15.) This bearing 16 of the knuckle rests on the shorter arm of an elbow-lever 18, which is arranged to rock transversely of the rail and has its longer arm connected to the central brake-actuating mechanism. (See Figs. 5, 7, 8, and 18.) In operation said brake-lever 18 has its fulcrum at its elbow 19 on a movable wedge 20, said elbow being formed to exert a cam action thereon. The wedge 20 (shown in Figs. 4, 7, 8, 11, and 19) is also arranged to operate transversely of the rail with its thin end presented under the elbow of the lever, the wedge moving outward as the lever is rocked to apply the brakes. Said wedge rests on the inclined bottom of a guideway 21, which is secured between the outer ends of the angle-beams 9, being thus rigidly connected to the rail-brake block. Said guideway 21 (shown in detail in Fig. 17) has vertical

side walls to guide the wedge and side flanges which rest upon and are bolted to the horizontal flanges of said angle-beams 9, as shown in Figs. 4, 5, and 6. It is shown having also an end bottom lug 22, fitted between the horizontal spaces of the angle-beams and the projections of the rail-brake block, as in Figs. 7 and 8. The hangers 10 are shown having their lower ends hooked in eyes in side lugs or buttresses 23 of the guideway, thus upholding the whole rigid structure comprising angle-beams 9, guideway 21, and rail-brake block 6, with its brake-shoe 7. Movement of the brake-lever 18 inward, as in Fig. 8, lifts the knuckle of the toggle, and thus applies the wheel-brake shoes 5 through the toggle-links 12, the pintle 11 of said toggle moving in the aforesaid vertical slot in the rail-brake block 6, while the rail-brake shoe 7 is simultaneously applied by action of the fulcrum or elbow 19 of the lever upon the wedge 20, which, as aforesaid, moves outward under the elbow as the lever is rocked to apply the brakes, the cam-shaped elbow 19 and wedge 20 forcing the rail-brake block downward against resistance of the spring-hangers 10. The brake-lever is kept in proper position by a guide-pin 17, inserted through its elbow portion and movable up and down in vertical slots or guides in the sides or walls of the guideway 21, (shown in Figs. 4 and 5,) thus allowing relative up-and-down movement between the brake-lever and the wedge 20 and rail-brake block. The manner of applying the brakes will be more fully explained hereinafter.

The illustrated brake-actuating mechanism will now be described.

Depending from the middle of bars 3 is a U-shaped hanger 24, supporting a central spider 25 and having a backwardly-projecting arm 26, to which is fulcrumed the main central lever 27, working transversely to the car-axes. (See Figs. 3, 4, 5, 9, and 10.) Power for actuating the brakes is applied to this lever through any suitable connections, as by the connecting-rod or draft-bar 28. (Shown in Fig. 2.) Said lever is connected by clevis 29 and links 30 to the shorter arms of horizontally-vibratory bell-crank levers 31, shown fulcrumed in arms 32, projecting diagonally backward from the spider 25. The longer arms of said bell-crank levers are pivotally connected by connecting-rods 33 with the upright arms of the brake-levers 18 at opposite sides of the truck. They are also connected by short links 34 with the upper short arms of intermediately-fulcrumed levers 35, shown fulcrumed in lateral arms 36 of the spider, so as to move transversely of the track-rails. The lower and longer arms of said levers 35 are connected to the wedges 20 by resilient telescopic connecting-rods 37. One of these telescopic rods is shown in detail in Fig. 11. It comprises a tube pivotally-

attached to said lever 35 and a rod fitted therein having its outer end pivotally attached to the inner or larger end of wedge 20, with a stout coiled spring 38 inclosed in said tube and forcing the rod outward, movement being suitably limited, as by a pin 39 in the tube passing through a slot in the rod. The two levers 35 are shown in Figs. 3 and 5 connected by a stout retractile spring 40, which serves to retain the brake-actuating mechanism in normal position and to restore the parts to such position when power is released form the brakes.

The operation is as follows: To actuate the brakes, power is applied to central lever 27, which, through bell-crank levers 31 and connecting-rods 33, pulls inward the opposite brake-levers 18, thus lifting the toggles 12, which connect the wheel-brakes, while through intermediate levers 35 and telescopic rods 37 the wedges 20 are pushed outward under the elbows of said brake-levers 18. The movements of the wedges are quicker than those of the brake-levers, since the telescopic connecting-rods 37 are connected to the longer arms of the intermediate levers 35. Hence the wedges move quickly into contact with the elbows of the brake-levers. As said levers 18 move inward their approximately horizontal arms lift the toggles 12, and thereby apply the wheel-brakes, while the downward pressure of the lever-elbows or cams 19 on the advancing wedges forces down the rail-brakes. The necessary vertical movements of the rail-brake blocks to depress the rail-brake shoes are thus quickly effected by the conjoint action of the wedge and cam or elbow of the lever, and by reason of the accelerated movement thus imparted the shoe may at all times be lowered the required distance for contact with the rail without loss of time in effecting such movement, as the distance the shoe must travel is increased by wear. It will be observed that in each set of brakes the application of forces is centralized at the elbow of the brake-lever, and the pressure exerted against each brake-shoe reacts on the others, the wheel-brake shoes reacting on the rail-brake shoe and the latter reacting on the former. As the telescopic rod 37 pushes the wedge 20 outward the normal pressure of its inclosed spring 38 maintains the rod at its full length; but as the pressure of the elbow of the brake-lever on the wedge increases so does the tension of said spring, allowing the telescopic rod to shorten. In each brake movement the wedge will move outward to a certain position before the pressure of the elbow-lever or cam 19 is sufficient to overcome the resistance of the spring. As the rail-brake shoe and wheel-brake shoes wear by repeated operations, the outward movement of the wedge increases in length—that is, the wedge moves farther before the resistance of the

spring 38 is overcome, and the knuckle of the toggle 12 is raised higher and the rail-block 6 is depressed lower, so that the wear of the brake-shoes is taken up automatically.

As well known, the life of a brake-shoe, especially a rail-brake shoe, is very short, owing to its constant hard usage and rapid wear. With ordinary car-brakes considerable time and trouble are expended from time to time in adjusting the brake-applying mechanism to compensate for wear and take up the increased movements of the shoes necessary to effect the desired contact, and when the shoes are replaced, which is frequently necessary as often as every two or three weeks, the mechanism has to be readjusted to its former position to accommodate the new brake-shoes; but by virtue of our invention no such manipulative adjustments are necessary after the mechanism is properly adjusted in the first instance, for the take-up wedge automatically increases its outgoing movements to compensate for wear and prevent lost motion, and when the old shoes are detached and replaced by new ones the movements of the wedge automatically lessen to allow for the new shoes, and hence constant movements of the brake-lever and the main central lever are maintained.

We claim as our invention and desire to secure by Letters Patent of the United States—

1. A car-brake having, in combination, two opposed wheel-brake shoes, an intermediate rail-brake shoe, connections between the brake-shoes whereby the forces applied thereto act in three distinct lines meeting at an intermediate point and are thus caused to react on each other, and brake-actuating mechanism.

2. A car-brake having, in combination, two opposed wheel-brake shoes, an intermediate rail-brake shoe, and a brake-actuating device separately connected to the three brake-shoes for applying them together, the connections causing the forces applied to the several brake-shoes to react on each other.

3. A car-brake having, in combination, two opposed wheel-brake shoes, an intermediate rail-brake shoe, the latter operating in an opposite direction to the former, and a brake-actuating device connected to the three brake-shoes at a substantially central location which is surrounded by the brake-shoes and adapted to apply them all together, the connections causing the forces applied to the several brake-shoes to react on each other.

4. A car-brake having, in combination, two wheel-brake shoes connected by a toggle, a rail-brake shoe, and a brake-actuating device acting between the knuckle of the toggle and the rail-brake shoe so as to raise the former and depress the latter.

5. A car-brake having, in combination, two opposed wheel-brake shoes connected by

a toggle, a rail-brake shoe, and a brake-lever having its fulcrum supported by said rail-brake shoe and having an arm taking under the knuckle of the toggle.

5 6. A car-brake having, in combination, two opposed wheel-brake shoes connected by a toggle, a rail-brake shoe below the knuckle of the toggle, and a wedge adapted to enter between said knuckle and rail-brake shoe to
10 lift the former and depress the latter for application of the brakes.

7. A car-brake having, in combination, two opposed wheel-brake shoes connected by a toggle, a rail-brake shoe below the knuckle
15 of the toggle, a brake-lever having an arm taking under the knuckle of the toggle, and a movable wedge adapted to enter between the rail-brake shoe and fulcrum of the lever for depressing said rail-brake shoe by pressure of
20 said fulcrum on said wedge.

8. A car-brake having, in combination, two opposed wheel-brake shoes connected by a toggle, a rail-brake shoe, a bent brake-lever having an arm taking under the knuckle of
25 the toggle, and a movable wedge adapted to enter between the rail-brake shoe and elbow of said lever and sustain pressure thereof as the lever rocks on its elbow as a fulcrum.

9. A car-brake having, in combination,
30 two opposed wheel-brake shoes connected by a toggle, a rail-brake shoe, and a bent brake-lever having its fulcrum supported by said rail-brake shoe and having an arm taking under the knuckle of the toggle, the elbow of
35 said lever having a cam adapted, when the lever is moved for lifting said knuckle, to bear downward and depress the rail-brake shoe.

10. A car-brake having, in combination,
40 two opposed wheel-brake shoes connected by a toggle, a rail-brake shoe, and a bent brake-lever having its fulcrum supported by said rail-brake shoe and having an arm taking under the knuckle of the toggle, the elbow of
45 said lever having a cam adapted when the lever is moved to lift said knuckle to bear downward and depress the rail-brake shoe, a movable wedge adapted to enter between the rail-brake block and said elbow of the lever,
50 and means automatically controlling movement of the wedge to compensate for wear of the brake-shoes.

11. A car-brake having, in combination, two opposed wheel-brake shoes connected by a toggle, a rail-brake shoe, a bent brake-lever
55 having an arm taking under the knuckle of the toggle, and a movable wedge adapted to enter between the rail-brake shoe and elbow of said lever and sustain pressure thereof as the lever rocks on its elbow as a fulcrum, and
60 means for automatically varying movement of the wedge to compensate for wear of the brake-shoes.

12. A car-brake having, in combination, two opposed wheel-brake shoes connected by
65 a toggle, a rail-brake shoe below the knuckle

of the toggle, a brake-lever having an arm taking under the knuckle of the toggle, and a movable wedge adapted to enter between the rail-brake shoe and fulcrum of the lever for depressing said rail-brake shoe by pressure of
70 said fulcrum on said wedge, and automatic means controlling movement of the wedge to compensate for wear of the brake-shoes.

13. A car-brake having, in combination, two opposed wheel-brake shoes connected by
75 a toggle, a rail-brake shoe below the knuckle of the toggle, and a wedge adapted to enter between said knuckle and rail-brake shoe to lift the former and depress the latter for application of the brakes, and means automatic-
80 ally varying movement of the wedge to compensate for wear of the brake-shoes.

14. A car-brake having, in combination, two opposed wheel-brake shoes connected by
85 a toggle, a rail-brake shoe, and a brake-lever having its fulcrum supported by said rail-brake shoe and having an arm taking under the knuckle of the toggle, and means for automatically increasing the distance between
90 the fulcrum of said lever and the rail-brake shoe to compensate for wear of the brake-shoes.

15. A car-brake having, in combination, two opposed wheel-brake shoes connected by
95 a toggle, a rail-brake shoe, and a brake-lever having its fulcrum supported by said rail-brake shoe and having an arm taking under the knuckle of the toggle, and automatic means for taking up wear of the brake-shoes
100 allowing a constant stroke of the brake-lever.

16. A car-brake having, in combination, two wheel-brake shoes connected by a toggle,
105 a rail-brake shoe, and a brake-actuating device acting between the knuckle of the toggle and the rail-brake shoe so as to raise the former and depress the latter, and an automatic take-up device compensating for wear of the brake-shoes.

17. A car-brake having, in combination, two opposed wheel-brake shoes, an interme-
110 mediate rail-brake shoe, and a brake-actuating device acting between the rail-brake shoe and wheel-brake shoes for applying them in different directions, and means automatically compensating for wear of the brake-shoes.
115

18. A car-brake having, in combination, two opposed wheel-brake shoes connected by
120 a toggle, a rail-brake shoe, a brake-lever having an arm taking under the knuckle of the toggle, means for moving said lever to lift said knuckle, a movable wedge adapted to enter between the rail-brake shoe and fulcrum of the lever for depressing said rail-brake shoe by pressure of said fulcrum on
125 said wedge, and means for moving said wedge including a resilient telescopic push-rod therefor containing a spring for yieldingly maintaining the length of said push-rod.

19. A car-brake having, in combination, two opposed wheel-brake shoes connected by
130

a toggie, a rail-brake shoe, a bent brake-lever having an arm taking under the knuckle of the toggie, a wedge adapted to enter between the elbow-fulcrum of said lever and the rail-brake shoe, a main brake-actuating lever, a connecting-rod connected thereto and to the other arm of said bent brake-lever, an intermediate lever having a short arm also connected to said main lever and having a long arm, and a connecting-rod connecting said long arm and said wedge.

20. A car-brake having, in combination, two opposed brake-shoes connected by a toggie, a rail-brake shoe, a bent brake-lever movable transversely of the rail having an arm taking under the knuckle of the toggie, a wedge movable also transversely of the rail adapted to enter between the elbow-fulcrum of said lever and the rail-brake shoe, a main brake-actuating lever, a connecting-rod connected thereto and to the other arm of said bent brake-lever, an intermediate lever having a short arm also connected to said main lever and having a long arm, and a connecting-rod connecting said long arm and said wedge.

21. A car-brake having, in combination, a brake-shoe, an adjacent bearing-surface, a wedge, an actuating device for forcing said wedge between said surface and brake-shoe for applying the brake, and means for automatically varying the movement of said wedge to compensate for wear, allowing a constant movement of said actuating device.

22. A car-brake having, in combination, a brake-shoe, an adjacent bearing-surface, a wedge adapted to be forced between said surface and brake-shoe to apply the brake, and means for moving said wedge comprising a resilient telescopic rod.

23. A car-brake having, in combination, a brake-shoe, an adjacent bearing-surface, a wedge adapted to be forced between said surface and brake-shoe to apply the brake, and means for moving said wedge comprising a push-rod with an included spring adapted to yield when resistance on the wedge overcomes resistance of the spring.

24. A car-brake having, in combination, a brake-shoe, a brake-actuating lever, and an automatic movable take-up device acting between the fulcrum of said lever and brake-shoe to compensate for wear of the brake-shoe.

25. A car-brake having, in combination, a brake-shoe, a brake-actuating lever, and a movable wedge between the fulcrum of the lever and said brake-shoe, the pressure of said fulcrum when on the wedge applying the brake when the lever is moved in operative direction, said wedge being automatically adjustable to take up the wear of the brake-shoe.

26. A car-brake having, in combination, a brake-shoe, a brake-actuating lever whose

fulcrum acts against the brake-shoe to apply the brake, and a movable wedge adapted to enter between the fulcrum and brake-shoe as the lever is rocked or turned to apply the brake.

27. A car-brake having, in combination, a brake-shoe, a brake-lever for applying the brake and a movable wedge adapted to engage and shift the fulcrum of the lever, and means controlled by the wear of the brake-shoe for automatically moving said wedge to compensate for the wear.

28. A car-brake having, in combination, a brake-shoe, a cam, and a wedge which when the cam is operated moves between the cam and brake-shoe for applying the latter by pressure from the cam.

29. A car-brake having, in combination, a wheel-brake shoe, a brake-lever having an arm connected therewith, and an adjustable wedge under the fulcrum of said lever, the brake-lever being arranged between the wedge and brake-shoe.

30. A car-brake having, in combination, two opposed wheel-brake shoes connected by a toggie, and a bent brake-lever fulcrumed at its elbow and having an arm which takes under the knuckle of the toggie.

31. A car-brake having, in combination, two opposed wheel-brake shoes connected by a toggie, and a wedge adapted to move under the knuckle of the toggie and lift it in applying the brakes.

32. A car-brake having, in combination, two opposed wheel-brake shoes connected by a toggie, a brake-lever having an arm taking under the knuckle of the toggie, and a wedge under the fulcrum of the lever.

33. A car-brake having, in combination, a rail-brake shoe, a cam, and a wedge which moves between the cam and brake-shoe to depress the latter by coöperative action of said cam and wedge.

34. A car-brake having, in combination, a rail-brake shoe, a bent brake-lever whose elbow-fulcrum acts against the brake-shoe, and a wedge between said elbow and brake-shoe.

35. A car-brake having, in combination, a wheel-brake shoe, a rail-brake shoe, a brake-lever having an arm connected to the wheel-brake shoe and having its fulcrum supported by the rail-brake shoe, and a movable wedge acting between the fulcrum of said lever and said rail-brake shoe.

36. A car-brake having, in combination, a wheel-brake shoe, a rail-brake shoe, and a bent lever having its elbow acting as a fulcrum against the rail-brake shoe and having an arm connected to the wheel-brake shoe.

37. A car-brake having, in combination, a wheel-brake shoe, a rail-brake shoe, and a bent lever having its elbow acting as a fulcrum against the rail-brake shoe and having an arm connected to the wheel-brake shoe,

and a movable wedge acting under the elbow of said lever.

38. A car-brake having, in combination, a wheel-brake shoe, a rail-brake shoe, a bent
5 brake-lever having its elbow-fulcrum supported by the rail-brake shoe and having an arm operatively connected to the wheel-brake shoe, a wedge adapted to enter between the elbow of the lever and the rail-
10 brake shoe, and means for simultaneously moving the wedge and rocking the lever.

39. A car-brake having, in combination, a wheel-brake shoe, a rail-brake shoe, a bent
15 brake-lever having its elbow-fulcrum supported by the rail-brake shoe and having an arm operatively connected to the wheel-brake shoe, a wedge adapted to enter between the elbow of the lever and the rail-brake shoe, means for operating the lever to apply the
20 wheel-brake shoe, and means for more rapidly moving the wedge.

40. A car-brake having, in combination, a brake-shoe, a brake-applying device comprising a wedge, and a push-rod for moving said
25 wedge to operative position having an included spring adapted to yield under a certain resistance, thereby moving said wedge varying distances to compensate for wear of the brake-shoe.

30 41. A car-brake having, in combination, two wheel-brake shoes connected by a toggle, and a brake-lever movable in a direction transverse to the rail and having an arm taking under the knuckle of the toggle.

35 42. A car-brake having, in combination, two wheel-brake shoes connected by a toggle, an intermediate rail-brake shoe, a brake-lever operating in a direction transverse to the rail having its fulcrum supported by the
40 rail-brake shoe and having an arm taking under the knuckle of the toggle.

43. A car-brake having, in combination, two wheel-brake shoes connected by a toggle, an intermediate rail-brake shoe, and a
45 brake-actuating device operating in a direction transverse to the rail and acting between the knuckle of the toggle and said rail-brake shoe to raise the former and depress the latter.

50 44. A car-brake having, in combination, two opposed wheel-brake shoes connected by a toggle, the arms of said toggle having turn-buckles with threaded sockets in their outer ends engaged by threaded stems of members
55 pivoted to the brake-shoes and with plain sockets in their inner ends engaged by plain stems of the knuckle members.

45. A car-brake having, in combination, two opposed wheel-brake shoes connected by
60 a toggle, an intermediate rail-brake shoe, the pintle of the toggle-knuckle passing through a vertical slot in the rail-brake block, a brake-lever movable transversely to the rail having its fulcrum supported by the rail-brake shoe
65 and having an arm taking under the knuckle

of the toggle, and a movable wedge acting between the rail-brake shoe and knuckle of the toggle.

46. A car-brake having, in combination, two opposed wheel-brake shoes and a rail-
70 brake shoe between adjacent wheels at each side of a truck, a toggle connecting each pair of wheel-brake shoes, a brake-lever for each set of brakes having a fulcrum supported by the rail-brake shoe and having an arm taking un-
75 der the knuckle of the toggle, a wedge supported on each rail-brake shoe adapted to act under the fulcrum of the lever, a central lever, connections between it and the opposite brake-levers, and connections between it and
80 the opposite wedges adapted to move the latter more rapidly than the brake-levers.

47. A car-brake having, in combination, two opposed wheel-brake shoes, an intermediate rail-brake shoe, and a brake-actuating
85 device connected to the three brake-shoes at a location intermediate any two of the same and adapted to apply them all together by the same movement, all the brake-shoes being connected to react upon each other.
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48. A car-brake having, in combination, two opposed wheel-brake shoes and an intermediate rail-brake shoe having connection at a centralized or inclosed point whereby the
95 forces due to application of the brakes are in approximate equalization, and a brake-actuating device acting at said point and applying the several brakes in opposed directions.

49. A car-brake having, in combination, a wheel-brake shoe, a rail-brake shoe, and a
100 brake-lever having an arm connected to the wheel-brake shoe and having its fulcrum on a movable wedge which acts between said lever and the rail-brake shoe.

50. A car-brake having, in combination, two wheel-brake shoes connected by a toggle, a rail-brake shoe, a brake-lever having an arm supporting the knuckle of the toggle and its fulcrum on a sliding wedge which acts be-
110 tween said lever and the rail-brake shoe.

51. In a car-brake, a rail-brake shoe yieldingly suspended from the truck-frame, a lever operating to depress said shoe, and means for accelerating the movement of the shoe under the action of the lever in proportion to the in-
115 creased distance the shoe has to travel as it wears away.

52. In a car-brake, a rail-brake shoe, wheel-brake shoes, and a lever adapted to apply the wheel-brake shoes and simultane-
120 ously depress the rail-brake shoe, in combination with means acting on said lever to compensate for wear by imparting an accelerated movement to the rail-brake shoe in proportion to the increased distance it has to
125 travel as it wears away.

53. In a car-brake, a rail-brake shoe, wheel-brake shoes, a toggle connecting the latter, a lever having an arm acting on said toggle to apply the wheel-brake shoes and an elbow
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operating to simultaneously depress the rail-brake shoe, in combination with a sliding wedge adapted to take under said elbow and gradually increase the throw of the lever as the shoe wears away.

54. In a car-brake, wheel-brake shoes, and an intermediate rail-brake shoe, and connections whereby pressure exerted in applying the brakes acts and reacts on each of the connected shoes, in combination with means for exerting such pressure transversely of said connections and of the direction of motion of the car, including an operating-lever movable in the direction of such motion, and connections between said operating-lever and such pressure-applying means extending transversely of the car from the center to the sides thereof.

55. In a car-brake, the combination with wheel-brake shoes and an intermediate rail-

brake shoe, connections between said shoes for applying pressure thereto, and means for exerting such pressure and imparting a differential speed accelerating the movement of the rail-brake shoe.

56. In a car-brake, the combination with wheel-brake shoes, and an intermediate rail-brake shoe, connections between said shoes for applying pressure thereto, means for exerting pressure on said shoes and accelerating the motion of the rail-brake shoe, and a self-adjusting device for automatically taking up the wear of the rail-brake shoe.

In testimony whereof we affix our signatures in presence of two witnesses.

ERNEST HOLMAN MILLER.

CHARLES VICTOR ROTE.

Witnesses:

W. E. PETERSON,
C. G. BASSLER.

It is hereby certified that in Letters Patent No. 811,863, granted February 6, 1906, upon the application of Ernest Holman Miller and Charles Victor Rote, of Lancaster, Pennsylvania, the title of the invention should read *Car-Brakes* instead of "Air-Brakes;" and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 20th day of March, A. D., 1906.

[SEAL.]

F. I. ALLEN,
Commissioner of Patents.