

(No Model.)

4 Sheets—Sheet 1.

A. C. AMES.

DRIVING MECHANISM FOR ROAD VEHICLES.

No. 500,544.

Patented July 4, 1893.

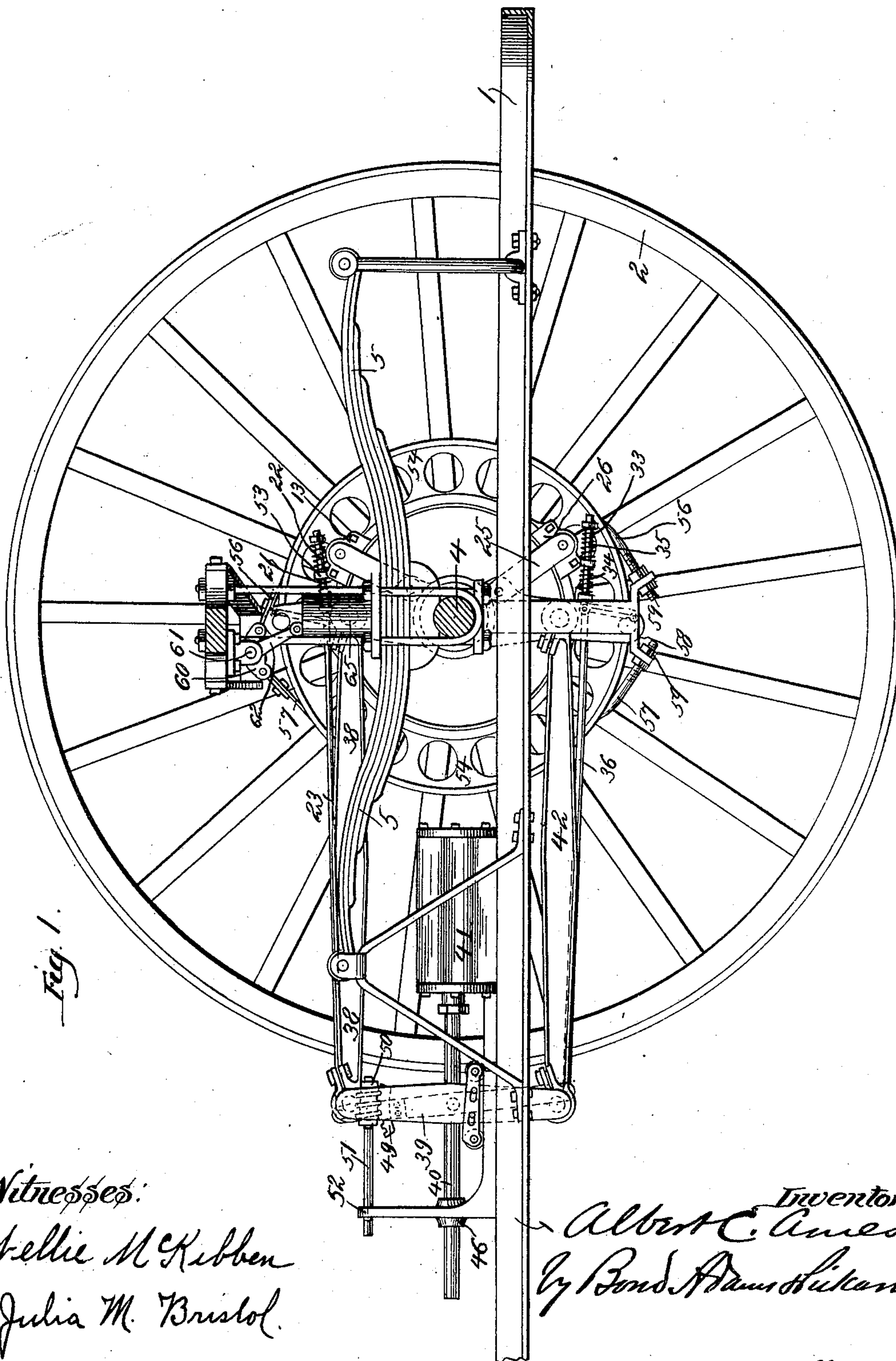


Fig. 1.

Witnesses:

Kellie McKibben
Julia M. Bristol.

Inventor:

Albert C. Ames
By Bond Adams & Lusk.

Attorneys.

(No Model.)

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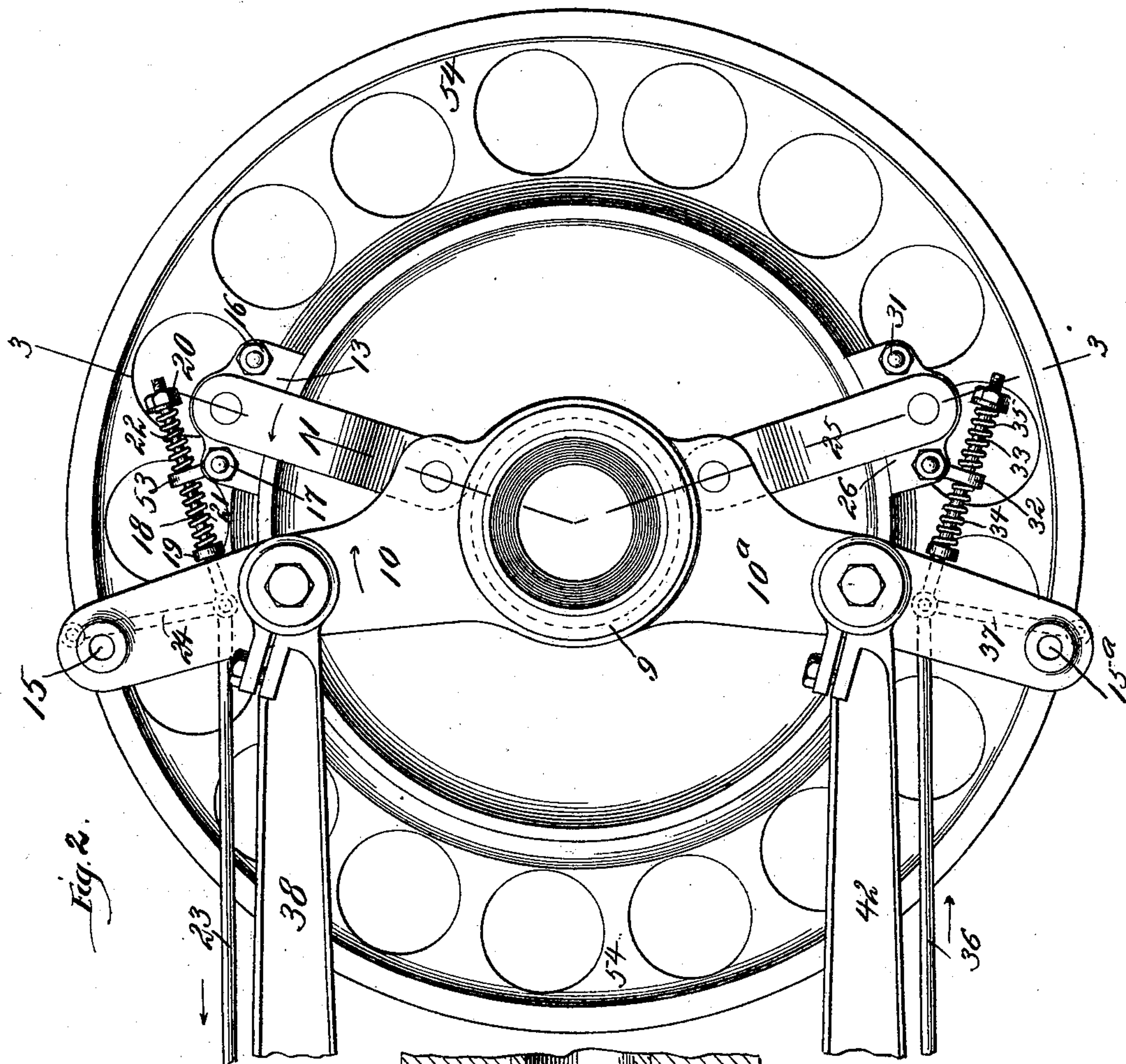


Fig. 2.

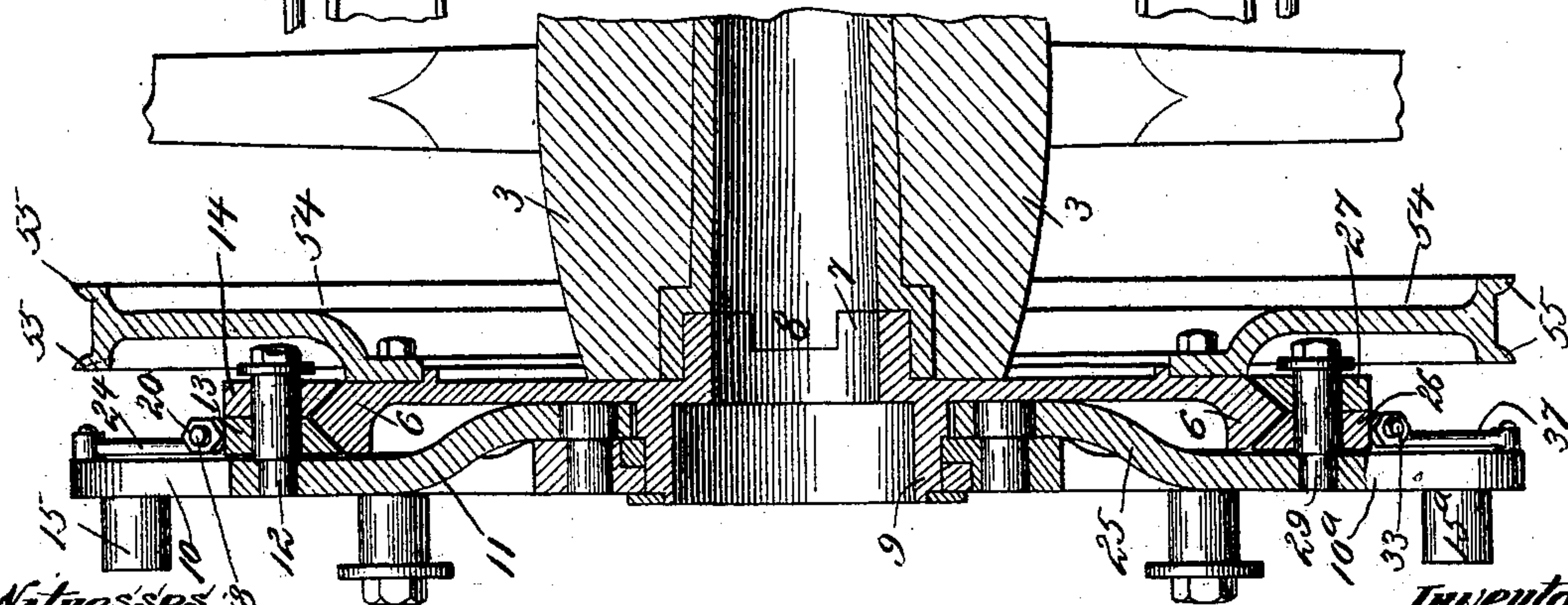


Fig. 3

Witnesses:
Helle M. Hibben
Julia M. Bristol.

Inventor:
Albert C. Ames
By Bond & Sons, Attorneys

(No Model.)

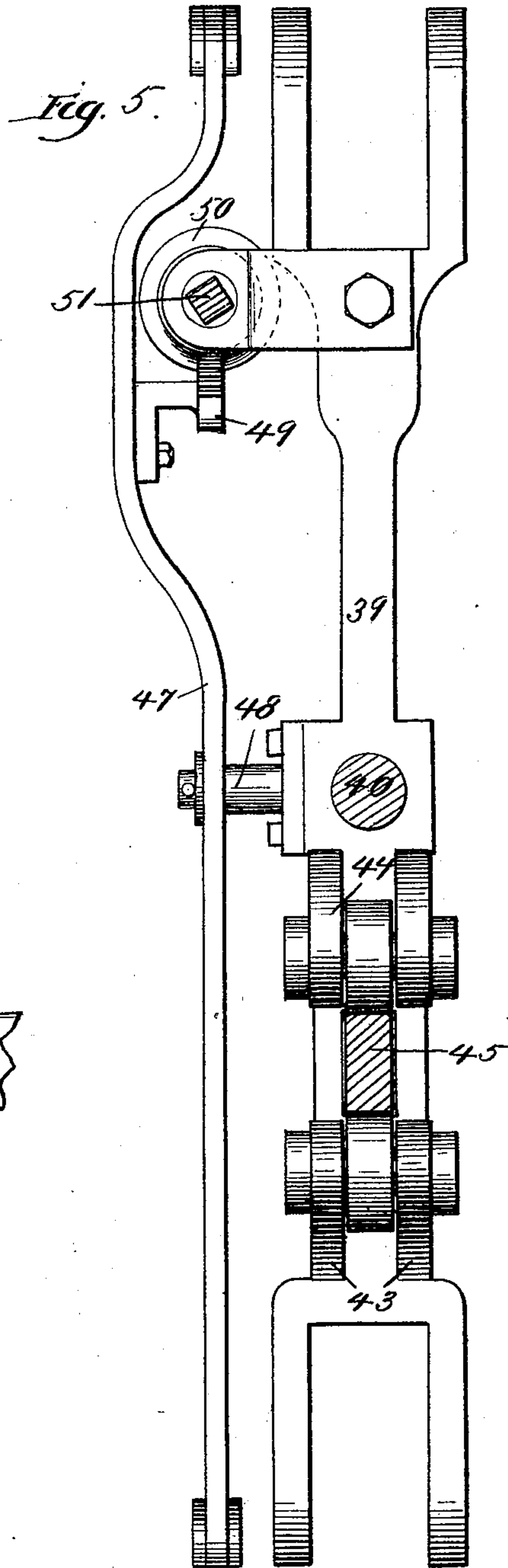
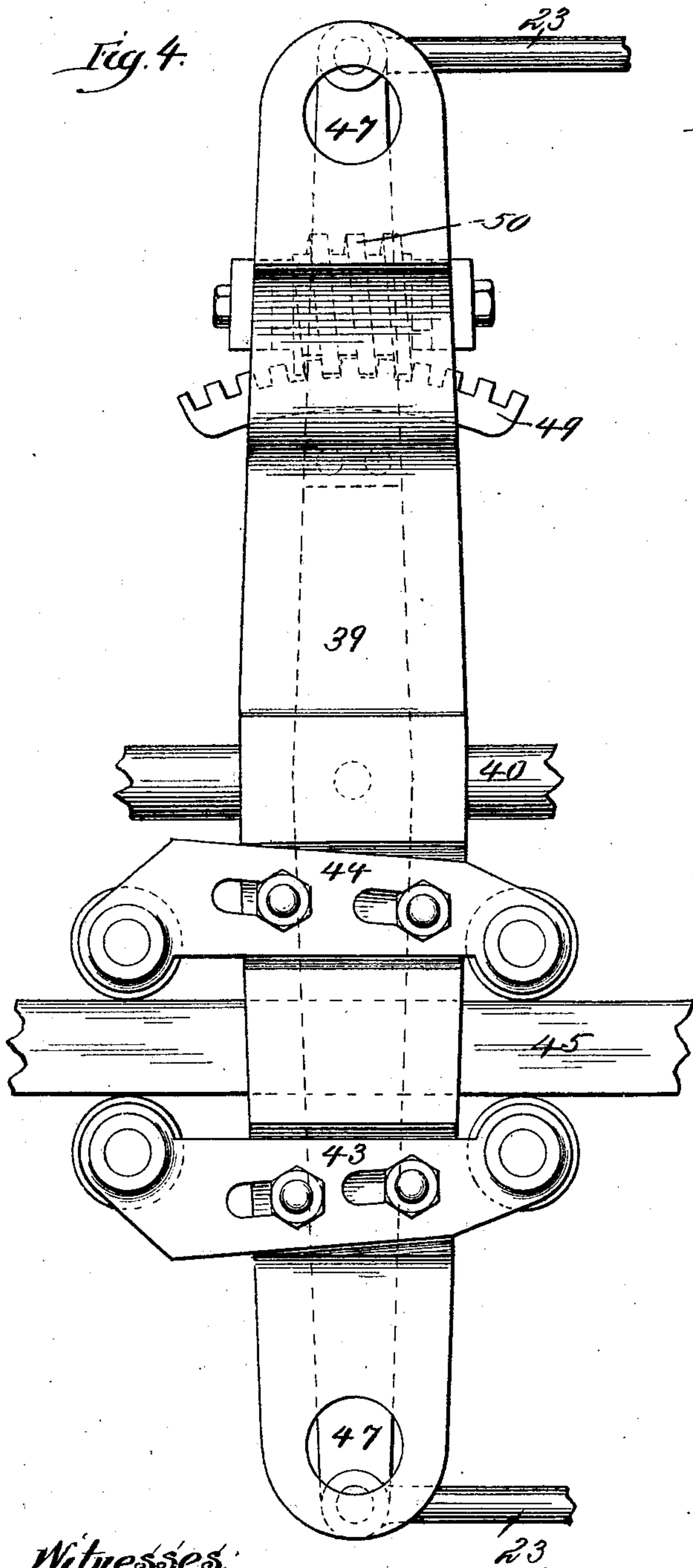
4 Sheets—Sheet 3.

A. C. AMES.

DRIVING MECHANISM FOR ROAD VEHICLES.

No. 500,544.

Patented July 4, 1893.



Witnesses:
Nellie M. Gibben
Julia M. Bristol

Inventor:
Albert C. Ames
By Bond Adams & Hickman.
Attorneys.

(No Model.)

4 Sheets—Sheet 4.

A. C. AMES.
DRIVING MECHANISM FOR ROAD VEHICLES.

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Fig. 6.

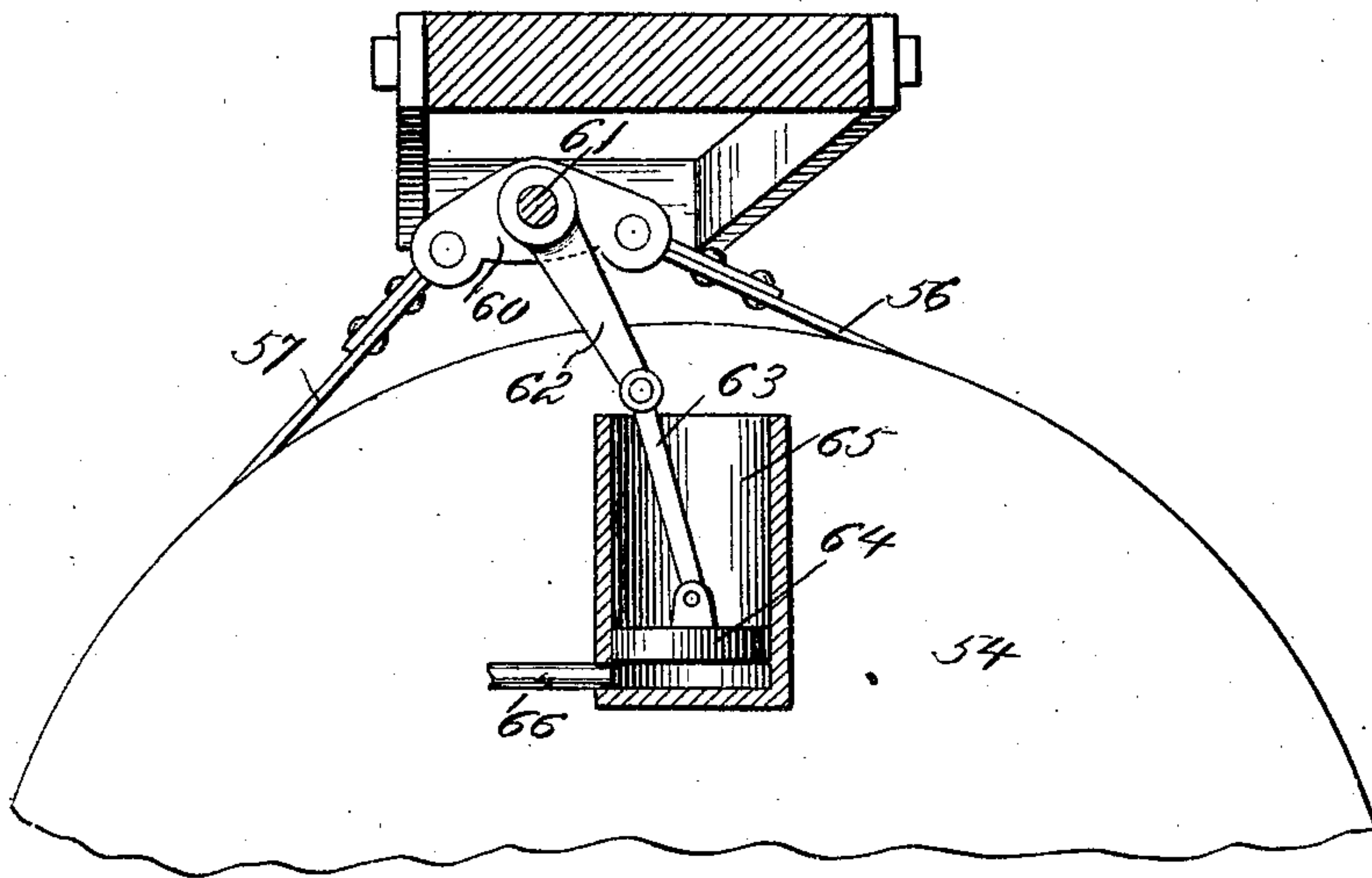
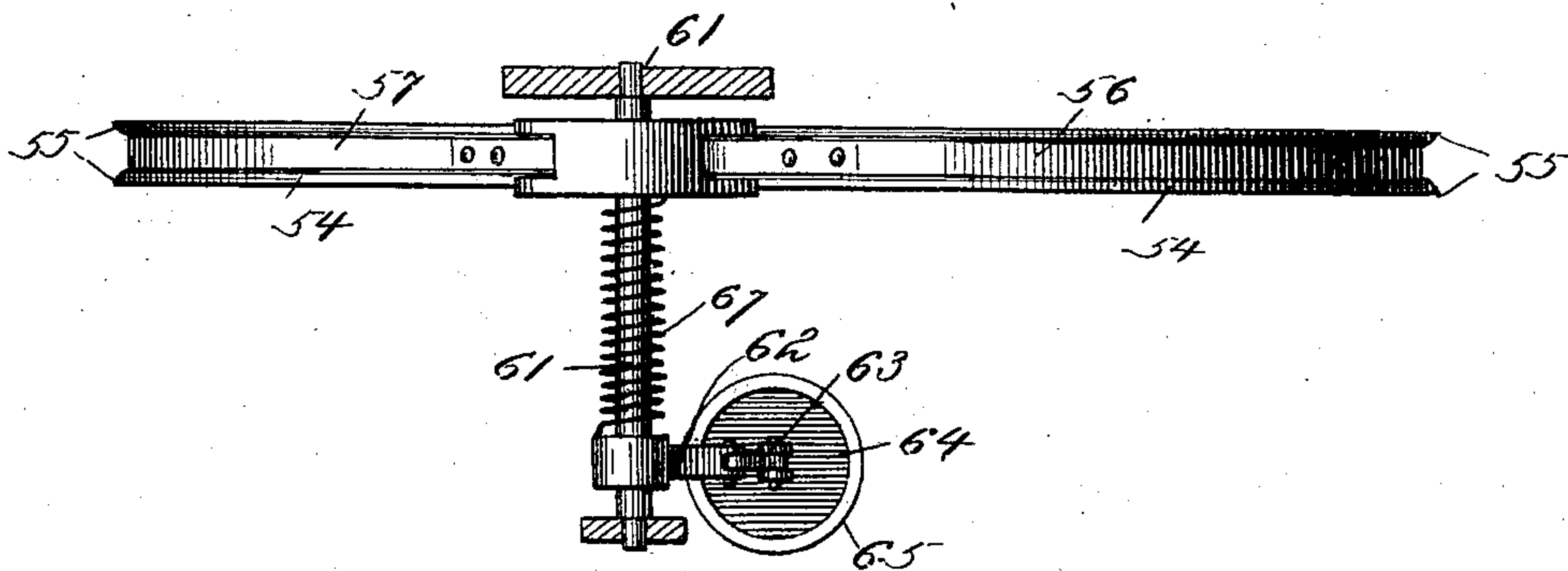


Fig. 7.



Witnesses:

Mellie M. Kibben.
Julia M. Bristol.

Inventor:

Albert C. Ames
by Paul Adams Hickard.

Attorneys.

UNITED STATES PATENT OFFICE.

ALBERT C. AMES, OF CHICAGO, ILLINOIS.

DRIVING MECHANISM FOR ROAD-VEHICLES.

SPECIFICATION forming part of Letters Patent No. 500,544, dated July 4, 1893.

Application filed June 4, 1892. Serial No. 435,555. (No model.)

To all whom it may concern:

Be it known that I, ALBERT C. AMES, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Driving Mechanism, of which the following is a specification, reference being had to the accompanying drawings, in which—

Figure 1 is a longitudinal vertical section of a portion of an engine, showing one wheel and the arrangement of the driving mechanism. Fig. 2 is an enlarged detail, being a side elevation of the wheel hub, showing a portion of the driving mechanism. Fig. 3 is a similar view, being a vertical cross section on line 3—3 of Fig. 2. Fig. 4 is an enlarged detail, being a side elevation of the cross-head, showing the reversing apparatus. Fig. 5 is an end view of the parts shown in Fig. 4. Fig. 6 is an enlarged detail, being a side view of a portion of the brake wheel, showing the brake; and Fig. 7 is a top view of the parts shown in Fig. 6.

My invention relates to mechanism for driving the wheels of traction engines or other vehicles, and is particularly adapted to be used in connection with the traction engine described in my former application, Serial No. 356,998, filed June 27, 1890. My invention may, however, be applied to wheels of other descriptions, and I do not wish to limit myself to its application to any particular kind of mechanism.

The principal object of my invention is to provide new and improved driving mechanism, which may be operated by steam or equivalent power, and which will be continuous in its operation, or which may readily be reversed, substantially as described in my former application hereinbefore referred to.

Another object of my invention is to provide a new and improved brake for use in connection with the above mentioned driving mechanism.

I accomplish the above objects as hereinafter specified and as illustrated in the drawings.

That which I regard as new will be pointed out in the claims.

In the drawings,—1 indicates the frame of a traction engine, which frame is supported by two wheels 2. As both sides of the traction

engine are substantially similar, I have shown only one, it being understood that the description of one side applies equally to the opposite side of the machine. The wheel 2 is provided with a hub 3, which is adapted to fit upon a spindle carried by an axle-tree 4. The frame 1 is supported by springs 5, which are supported upon the axle-tree 4, as best shown in Fig. 1.

6 indicates a clutch wheel, which is secured upon one end of the hub 3, as best shown in Fig. 3. The clutch wheel 6 is held upon the end of the hub 3 by the axle collar and the nut which secures the hub upon the spindle. In order to key the clutch wheel 6 to the hub 3, it is provided with tongues 7, which interlock with similar tongues 8 formed on the end of the hub 3 or upon a sleeve fitted in the hub, thereby forming a clutch, as shown in Fig. 3. The clutch wheel 6 is formed of metal, and its periphery is doubly beveled, making it V-shape in cross section, as best shown in Fig. 3. The clutch wheel 6 is provided with a hub 9, as shown in Fig. 3.

10, 10^a indicate levers, which are pivoted upon the hub 9 of the clutch wheel 6, as shown in Fig. 3.

11 indicates an arm which is pivoted at its lower end to a portion of the lever 10 near the hub 9, as best shown in Fig. 2, and projects a little beyond the periphery of the clutch wheel 6.

12 indicates a pin which is mounted in the upper end of the arm 11, and extends horizontally over the clutch wheel 6, as shown in Fig. 3.

13 and 14 indicate two beveled shoes which are mounted upon the pin 12, and which are adapted to bear upon the beveled surfaces of the clutch wheel 6, as shown. The shoes 13 and 14 are held at a fixed distance from each other by bolts 16 and 17, as shown in Fig. 2. By inserting washers between the shoes they may be adjusted to and held at any desired distance apart, to take up wear.

53 indicates a lug or ear formed upon or connected to one of the shoes 13 or 14, which lug is provided with an eye through which passes a rod 18. The rod 18 is provided with nuts 19 and 20 at its ends, and carries springs 21 and 22 respectively between the nut 19 and the ear 53 and the ear 53 and nut 20. The nut 20 works on a screw thread so that

it may be removed or its position on the rod 18 may be adjusted to vary the tension of the springs. The inner end of the rod 18 is connected to a connecting rod 23, which is
5 connected to reversing mechanism, which will be hereinafter described.

24 indicates a link, which is pivoted near one of the outer ends of the lever 10, and is connected at its lower end to the rod 18 and
10 connecting rod 23, as indicated by dotted lines in Fig. 2.

The adjustment of the shoes 13 and 14 is such that when their pivot and the pivot of the arm 11 are in line with the center of the
15 clutch wheel 6, the inner surfaces of the shoes will be held about one sixty-fourth of an inch away from the surface of the clutch wheel. By rotating the arm 11 a short distance, the shoes 13 and 14 will be thrown into
20 engagement with the periphery of the clutch wheel.

25 indicates a second arm which is pivoted to the lever 10^a, and is substantially similar to the arm 11. The arm 25 carries shoes 26 and 27, which are mounted upon a pin 29, which is mounted in the outer end of the arm
25 25. The shoes 26 and 27 are held at a proper distance apart by bolts 30 and 31, which are in all respects similar to the bolts 16 and 17.

30 32 indicates an ear similar to the ear 53, and is formed upon one of the shoes 26 or 27.

33 indicates a rod similar to the rod 18, upon which are mounted springs 34 and 35 similar to the springs 21 and 22. The rod 33
35 is connected to a connecting rod 36, similar to the rod 23.

37 indicates a link similar to the link 24. The arm 25 projects in a direction nearly opposite to that of the arm 11, so that the shoes
40 carried by them engage nearly opposite portions of the periphery of the clutch wheel.

38 indicates a connecting rod, which connects the lever 10 to the upper end of a cross-head 39, which is mounted upon a piston rod
45 40, operated by a cylinder 41.

42 indicates a connecting rod which connects the lever 10^a with the lower end of the cross-head 39, as shown in Fig. 1. The cross-head 39 is provided with two trucks 43 and
50 44, which run upon the upper and under sides of a bar 45, and serve to give the cross-head a steady and easy motion and to take the strain off the piston and cross head. The outer end of the piston rod 40 moves in a
55 bearing 46, as shown in Fig. 1.

47 indicates a rocking bar, which is centrally mounted upon a pivot 48 connected to the cross-head 39, as best shown in Fig. 5.

49 indicates a segmental rack, which is rigidly connected to the rocking bar 47, and intermeshes with the threads of a worm 50, as
60 best shown in Figs. 1 and 4. By rotating the worm, the bar 47 may be rocked as indicated by dotted lines in Figs. 1 and 4.

65 The worm 50 is operated by means of a bar 51, angular in cross-section, which is adapted to move in a suitable passage in the worm.

The outer end of the rod 51 is mounted in a bearing in the upper end of a standard 52, as shown in Fig. 1. The arrangement is such
70 that when the piston 40 is reciprocating the worm will be moved upon the bar 51, which will remain stationary.

The rear ends of the rods 23 and 36 are connected respectively to the upper and lower
75 ends of the bar 47, as best shown in Figs. 4 and 5, so that when the bar 47 is rocked one of the rods 23 or 36 will be moved forward, while the other is moved in the opposite direction. By moving the rods 23 or 36 back-
80 ward or forward, the rods 18 and 33 will be moved correspondingly, thereby compressing one or the other of the springs carried by said rods and adjusting the position of the arms 11 and 25. If, for instance, the rod 23 were
85 moved backward,—that is, in the direction indicated by the arrow in Fig. 2,—the rod 18 would also be moved backward, compressing the spring 22. The backward movement of the rod 18 would move the arm 11 backward,
90 as indicated by the arrow in Fig. 2, until the shoes 13 and 14 would come in contact with the periphery of the clutch wheel 6.

The adjustment of the various parts is such that when the rocking bar 47 is in a vertical
95 position, as indicated by dotted lines in Fig. 4, the arms 11 and 25 will be held in such position that the pivots of the shoes 13 and 14 will be in line with the pivot of the arm 11 and with the center of the clutch wheel. The
100 pivot of the shoes 26 and 27 will also be in line with the pivot of the arm 25 and the center of the clutch wheel, the shoes on both arms 11 and 25 being at this time about one sixty-fourth of an inch from the periphery of the
105 clutch wheel, as hereinbefore stated. It will therefore only require a very slight movement of the rocking bar 47 out of the perpendicular to move the arms 11 and 25 sufficiently to bring the shoes carried by them into engage-
110 ment with the periphery of the clutch wheel. When the shoes 13 and 14 have been moved in the direction indicated by the arrow in Fig. 2 and come into engagement with the clutch wheel, as above described, the spring 22 will
115 be compressed, and, acting through the ear 53, will hold the shoes 13 and 14 in contact with the periphery of the clutch wheel. When the lever 10 is moved in the direction indicated by the arrow in Fig. 2 by the movement of the
120 piston, the shoes 13 and 14 will thereby be held firmly in frictional engagement with the periphery of the clutch wheel, and as the pivot of the shoes will be held out of line with the pivot of the arm 11 and with the center of the
125 clutch wheel, the shoes will be prevented from slipping over the surface of the clutch wheel, and will rotate the clutch wheel with the lever 10 when said lever is moving as indicated. When the lever 10 moves in the opposite di-
130 rection, the spring 22 will be compressed sufficiently to permit the shoes 13 and 14 to slide over the periphery of the clutch wheel, and therefore they will not act to rotate the wheel

in the opposite direction. At the same time, the rocking of the arm 47 to move the rod 23, as above described, will throw the rod 36 in the opposite direction to that in which the rod 23 is moved, as indicated by the arrow in Fig. 2. This will move the arm 25 in a direction opposite to that in which the arm 11 is moved, thereby throwing the pivot of the shoes 26 and 27 out of line with the pivot of the arm 25 and the center of the clutch wheel, in a manner similar to that in which the arm 11 and shoes 13 and 14 are moved. As the shoes 26 and 27 are on the opposite side of the clutch wheel to that upon which the shoes 13 and 14 are placed, they will operate to rotate the clutch wheel on the return movement of the lever 10^a. When the cross-head 39 is reciprocated by the piston 40, the levers 10 and 10^a will be moved backward and forward together, the arms 11 and 25 being moved in the same direction as their respective levers 10 and 10^a. When the shoes 13 and 14 are rotating the clutch wheel 6, the shoes 26 and 27 will therefore be sliding over the surface of the clutch wheel, and vice versa. The clutch wheel will thereby be given a continuous and uniform rotation.

To reverse the direction of rotation of the clutch wheel, the rocking bar 47 is rocked in the opposite direction from that indicated in Fig. 1, by means of the worm 50, thereby throwing the pivots of the shoes 13 and 14, and 26 and 27, out of line in the opposite direction. Their action will thereby be reversed.

54 indicates a brake wheel, which is rigidly attached to the clutch wheel 6 or to the hub 3 of the wheel. The wheel 54 is preferably provided with flanges 55, as shown in Fig. 3.

56 and 57 indicate two brake straps, which together encircle the wheel 54, and are connected at their lower ends by a bracket 58, as best shown in Fig. 1. The ends of the straps 56 and 57 are secured in the bracket by means of nuts 59, which are screwed upon them. By adjusting the position of the nuts, the tension of the brake straps may be adjusted. The upper ends of the straps 56 and 57 are connected to a lever 60, mounted upon a shaft 61, which is supported in suitable bearings.

62 indicates a lever, which is also mounted upon the shaft 61, and is connected at one end to a connecting rod 63, which in turn is connected to a piston head 64. The piston head 64 moves in a cylinder 65, as shown in Fig. 6.

66 indicates a steam pipe which admits steam into the cylinder 65 below the piston head 64, as shown. The cylinder 65 is located in such position that when the piston head is forced up, the lever 62 will be moved upward, thereby rocking the lever 60 and drawing the ends of the brake straps 56 and 57 toward each other, and setting the brake upon the brake wheel. The shaft 61 is provided with a spring 67, which is connected to a suitable fixed support in such manner that when the shaft 61 is rotated to rock the lever 60, the

tension of the spring 67 will tend to return the lever 60 to its normal position, thereby throwing off the brake.

Steam is supplied to the pipe 66 by means of a suitable throttle valve, so arranged that the steam may be readily turned on and off.

Instead of making the clutch wheel 6 with a smooth periphery, as shown, it may be provided with ratchet teeth, and the clutch shoes would then be provided with similar ratchet teeth. The construction shown, however, is that which I prefer.

The length of stroke of the piston and the length of the levers 10, 10^a, determine the amount of rotation given by each reciprocation of the piston, and by adjusting the points of connection of the connecting rods 38 and 42 to the levers 10, 10^a respectively, the amount of rotation may be changed without changing the speed of the piston. The power of the engine will also be altered by thus changing the length of the levers 10, 10^a, as it is obvious that the leverage will thereby be increased or diminished. This feature constitutes one of the most important results attained by my invention, as it permits of the use of less powerful engines, where it has heretofore been necessary to use engines of great power. The absence of gearing is also advantageous, as the construction of the machine is thereby greatly simplified and cheapened.

In the drawings I have shown the levers 10, 10^a as being provided with pins 15, 15^a, to provide for the adjustment of the connecting rods 38 and 42, for the purpose above described.

That which I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination with a clutch wheel, of suitable levers 10 and 10^a mounted concentrically with the clutch wheel, clutching devices carried by said levers and adapted to engage the clutch wheel, and means for operating said levers, substantially as described.

2. The combination with a clutch wheel, of levers as 10 and 10^a mounted concentrically with the clutch wheel and provided with pivoted arms, clutch shoes pivotally connected with said arms and adapted to engage the clutch wheel, a reciprocating cross-head, and means for connecting the cross-head with said levers, substantially as described.

3. The combination with a clutch-wheel, of levers as 10 and 10^a mounted concentrically with the clutch wheel, beveled clutch shoes connected with and carried by said levers and adapted to clutch said wheel on opposite sides thereof when moved in one direction, a reciprocating cross-head, and connecting rods between said cross-head and levers, substantially as described.

4. The combination with a clutch wheel, of levers as 10 and 10^a mounted concentrically with the clutch wheel, beveled clutch shoes connected with and carried by said levers and adapted to clutch said wheel on opposite sides thereof when moved in one direction,

and reciprocating mechanism connected with the levers, substantially as described.

5. The combination with a clutch wheel having a hub, of levers as 10 and 10^a mounted concentrically with said hub and provided with pivoted arms, clutch shoes carried by said arms and adapted to engage the opposite sides of the clutch wheel, means for actuating said levers, and means for reversing the clutches, substantially as described.

6. The combination with a clutch wheel, of levers as 10 and 10^a mounted concentrically with the clutch wheel and provided with pivoted arms, beveled clutch shoes pivotally connected with said arms, a reciprocating cross-head, rods connecting said cross-head and levers, a rock bar carried by the cross-head, and means for connecting said rock bar with the clutch shoes, substantially as described.

7. The combination with a clutch wheel having a hub, of levers as 10 and 10^a mounted concentrically with said hub and provided with pivoted arms, clutch shoes carried by said arms and adapted to engage the opposite sides of the clutch wheel, a cross-head for actuating said levers, and means for reversing the clutches, substantially as described.

8. The combination with a clutch wheel, having a hub, a lever 10 pivotally mounted upon said hub, and means for reciprocating said lever, of an arm 11 pivotally connected to said lever, a clutch carried by said arm 11 and adapted to clutch said clutch wheel when moved in one direction, and means for adjusting the angle of said arm 11 to the lever 10, substantially as described.

9. The combination with a clutch wheel, having a hub, a lever 10 pivotally mounted upon said hub, and means for reciprocating said lever, of an arm 11 pivotally connected to said lever, a clutch carried by said arm 11 and adapted to clutch said clutch wheel when moved in one direction, means for adjusting the angle of said arm 11 to the lever 10, a lever 10^a mounted upon said hub, devices for reciprocating said lever 10^a uniformly with said lever 10, arm 25 pivotally mounted upon said lever 10^a, clutch carried by said arm 25 and adapted to clutch said clutch wheel when moved in one direction, and means for adjusting the angle of said arm 25 to said lever 10^a, substantially as and for the purpose specified.

10. The combination with a clutch wheel having a hub, a lever 10 pivoted upon said hub, a cross-head 39, means for reciprocating said cross-head, and connecting rod 38 connecting said cross-head to said lever 10, of an arm 11 pivoted to said lever 10, a clutch carried by said arm, said clutch having an ear 53, rocking bar 47 connected to said cross-head 39, means for rocking said bar, rods 23 and 18 connecting said rocking bar to said ear 53, and springs mounted upon said rod 18 at opposite sides of said ear, substantially as and for the purpose specified.

11. The combination with a clutch wheel, a hub carried thereby, levers 10 and 10^a pivoted upon said hub, arms 11 and 25 pivoted to said levers 10 and 10^a respectively, and clutches carried by said arms, of a cross-head 39, means for reciprocating said cross-head, rocking bar 47 pivotally connected to said cross-head, said rocking bar having a segmental rack at one end, worm intermeshing with the teeth of said rack, means for rotating said worm to rock said bar, connecting rods connecting said cross-head to said levers 10 and 10^a, and means for adjusting the angle of the arms 11 and 25 to the respective levers, substantially as and for the purpose specified.

12. The combination with a clutch wheel having a V-shaped periphery, of beveled clutch shoes adapted to separately engage the opposite sides of the clutch wheel, levers mounted concentrically with said clutch wheel and adapted to support and carry the clutch shoes, devices for holding the shoes together, and means for operating said levers, substantially as described.

13. The combination with a clutch wheel, of levers as 10 and 10^a mounted concentrically with the clutch wheel and provided with pivoted arms, clutch shoes pivotally connected with said arms and adapted to engage the clutch wheel, means for adjusting said clutch shoes, and reciprocating mechanism for actuating the clutch carrying levers, substantially as described.

14. The combination with a cylinder, and a piston rod, of a cross-head connected to said piston rod, trucks 43 and 44 carried by said cross-head, and a bar 45 adapted to serve as a track for said trucks, substantially as described.

15. The combination with a brake wheel 54, brake straps 56 and 57 encircling said wheel, and lever 60 connected to said brake straps, of means for rocking said lever to cause said brake straps to bind or release said brake wheel, substantially as described.

16. The combination with a brake wheel 54, brake straps 56 and 57 encircling said wheel, and lever 60 connected to said brake straps, of means for rocking said lever to cause said brake straps to bind or release said brake wheel, shaft 61 supporting said lever 60, lever 62 mounted upon said shaft, spring 67 wound around said shaft and adapted to return said shaft to its normal position, cylinder 65, piston 64 mounted in said cylinder, connecting rod 63 connecting said lever 62 to said piston, pipe 66 adapted to conduct steam into the bottom of said cylinder, and means for supplying steam to said pipe, substantially as described.

ALBERT C. AMES.

Witnesses:

JOHN L. JACKSON,
RALPH VAN DYKE.