

PATENT SPECIFICATION



Application Date: Jan. 6, 1942. No. 217/42.

555,975

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Complete Specification Accepted: Sept. 15, 1943.

PROVISIONAL SPECIFICATION

Improvements in or relating to Motorcycles

We, VINCENT "H.R.D." COMPANY LIMITED, a British Company, and PHILIP CONRAD VINCENT, a British Subject, both of 3, High Street, Stevenage, Hertfordshire, do hereby declare the nature of this invention to be as follows:—

This invention relates to improvements in motorcycles. Usually, a motorcycle is provided with a triangulated framework in which is mounted the engine, together with its fuel and oil tanks, and has a steering head at the forward upper end from which forks extend downwardly to the front wheel hub. The forks of the rear wheel hub usually extend rearwardly from a lower part of the frame.

According to this invention a motorcycle is characterised in that the front and/or rear wheels is or are each supported by an arm of the like extending in a fore and aft direction and attached directly to the engine unit or to a member or members supporting the parts of the engine unit, the engine unit or such member or members being sufficiently strongly constructed to withstand the road shocks which are thus transmitted to them.

Either or each said arm may be pivotally secured to the engine unit or to said member or members, spring means being provided for resisting the pivotal movement. For example, said spring means may comprise a torsion rod secured at one end to said arm and extending trans-

versely thereto, and secured at the other end within a pivotal bearing in the engine unit. Alternatively, each said arm may constitute a spring in itself.

The arm for the front wheel may carry at its forward end a steering head such as a pivotally mounted stub-axle with which is associated an upwardly-extending operating transmission, which may be of a similar character to that usually employed for motor cars.

A hollow sheet metal body may be secured to the engine unit and may be arranged to support the driver's seat and auxiliary parts such as tanks, accumulator, headlight, windscreen and steering wheel, etc. Any of such parts may, however, if desired be supported by suitable brackets attached directly to the engine unit, in which case said sheet metal body part forms a housing for certain of these parts. It will be appreciated that by these means a separate triangulated framework can be entirely dispensed with. The invention is particularly applicable to a motorcycle having an engine such as is described in the specification of Application No. 216/42 (Serial No. 555,974).

Dated this 6th day of January, 1942.

BOULT, WADE & TENNANT,
111 & 112, Hatton Garden,
London, E.C.1,
Chartered Patent Agents.

COMPLETE SPECIFICATION

Improvements in or relating to Motorcycles

We, VINCENT "H.R.D." COMPANY LIMITED, a British Company, and PHILIP CONRAD VINCENT, a British Subject, both of 3, High Street, Stevenage, Hertfordshire, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to improvements in motorcycles. Usually, a motorcycle is

provided with a triangulated framework in which is mounted the engine, together with its fuel and oil tanks, and has a steering head at the forward upper end from which forks extend downwardly to the front wheel hub. The forks of the rear wheel hub usually extend rearwardly from a lower part of the frame.

According to this invention, a motorcycle is characterised in that the front and/or rear wheels is or are each sup-

ported by an arm or the like extending in a fore and aft direction along one side of the wheel only and attached directly to the engine unit which unit is sufficiently strongly constructed to withstand the road shocks which are thus transmitted to them, and spring means associated with said arms.

Either or each said arm may be pivotally secured to the engine unit or to said member or members, spring means being provided for resisting the pivotal movement. For example, said spring means may comprise a torsion rod secured at one end to said arm and extending through a bearing, and secured at the other end to the engine unit. Alternatively, either or each said arm may be rigidly attached to said engine unit or the like and the spring means may be arranged at or near the extremity between it and a wheel mounting.

In yet a further alternative arrangement either or each said arm may comprise a cantilever spring anchored rigidly at one end to the engine.

The arm for the front wheel may carry at its forward end a steering head such as a pivotally-mounted stub-axle with which is associated an upwardly-extending operating transmission, which may be of a similar character to that usually employed for motor cars.

A steering head may be provided comprising a wheel spindle arranged to rotate with the wheel, a bearing member carrying said spindle, an upright steering pivot rotatably mounted in said bearing to one side of said spindle and extending above and below it, and the aforesaid arm may be provided with a forked member which carries the said spindle to and means are provided for rotating the hub member relatively to said forked arm.

In the case where spring means are provided between the wheel mounting and said arm the aforesaid limbs of the fork are spaced away from the hub member and spring means are arranged on either side of the hub member between it and said limbs, the steering pivot and limbs of the fork member being so arranged as to permit movement of the hub member between said limbs along the axis of the steering pivot. Preferably, the steering pivot is fixed to the limbs of the fork member and the hub member is axially slidable upon it.

A hollow sheet metal body may be secured to the engine unit and may be arranged to support the driver's seat and auxiliary parts such as tanks, accumulator headlight, windscreen and steering wheel, etc. Any of such parts may, however, if desired, be supported by suit-

able brackets attached directly to the engine unit, in which case said sheet metal body part forms a housing for certain of these parts. It will be appreciated that by these means a separate triangulated framework can be entirely dispensed with. The invention is particularly applicable to a motorcycle having an engine such as is described in the specification of Application No. 216/42.

The following is a description of two embodiments of the invention, reference being made to the accompanying drawings, in which:

Figure 1 is a plan view of the motorcycle without the body;

Figure 2 is a side elevation of Figure 1;

Figure 3 is a horizontal section through the rear wheel and its drive;

Figure 4 is a horizontal section through the front wheel showing the steering mechanism;

Figure 5 is a horizontal section through the pivotal connection between the front wheel supporting arm and the engine;

Figure 6 is a similar view to Figure 4 of an alternative form of mounting for the wheel axle and steering pivot for an arm which is to be rigidly anchored to the engine unit;

Figure 7 is an elevation of the wheel mounting of Figure 6;

Figure 8 is a side elevation of a single-seater motorcycle with the body in position; and

Figure 9 is a similar view to Figure 8 but for a two-seater motorcycle.

As will be seen from Figure 2, the front and rear wheels 10 and 11 are supported directly from the engine 12 by means of supporting arms 13 and 14. The front wheel supporting arm is anchored to the main body of the engine by means of a torsion rod 15 as shown in Figure 5. The ends of the torsion rod are splined at 16 and 17 and the former splined end engages splines in one part of a bifurcated end of the supporting arm 13. The other splined end 17 engages splines in a boss 18 secured by studs 19 to a part of the main engine body 20. The boss and securing studs require to be sufficiently robust to withstand the road shocks submitted to them. The engine body is provided with two bearing holders 21 and 22 which are spaced apart and carrying a bearing sleeve 23 which extends between them and also extends beyond the bearing holder 22. The bifurcated part of the front wheel arm 13 rotatably engages the bearing sleeve along the projecting part thereof and along the part between the two bearing

holders 21 and 22, and may be provided with liners 24 and 25. The bearing sleeve is held against rotation in the two bearing holders by securing studs 26.

5 The anchorage for the rear wheel supporting arm 14 differs in that the end thereof is not bifurcated but is provided with a comparatively long bearing holder 27 which is rotatably mounted on a supporting rod 28 which is clamped in brackets 29 fixed to the engine body. Resistance to pivotal movement is provided by a spring 30 in place of a torsion rod. This spring is housed in a two-part telescopic casing 31, 32, the former of which parts is pivotally attached at 33 to a rearwardly-extending arm 34 fixed to the engine body, while the other part of the casing is pivotally attached at 35 to a bifurcated lug 36 formed on the rear supporting arm 13.

20 It will be appreciated that the anchorage for the rear supporting arm could be the same as that illustrated in Figure 5 for the front supporting arm or the anchorage for the front supporting arm could be the same as that described for the rear arm. Alternatively, either or both arms could be formed as a cantilever spring rigidly anchored to the engine.

As will be seen from Figure 4, the front wheel is supported by a stub-axle 37 having an upwardly-extending steering pivot 38 which is located in suitable bearings 39 (Figure 2) at the forward end of the supporting arm 13. Formed integrally with the stub axle and steering pivot is a lever arm 40 which is pivotally connected at 41 to a link 42. The other end of the link is pivotally attached at 43 with one arm 44 of a bell-crank lever which is pivotally mounted on a boss 45 on the underside of the bifurcated part of the supporting arm 13. The other arm 46 is coupled by a universal joint 47 with a transverse link 48 (see Figure 1) which in its turn is connected by a universal joint to a lever arm 49. This latter lever arm is secured to the lower end of an upright steering column 50 which is carried by suitable bearings (not shown) secured to the engine body. The upper end of the steering column is provided with conventional handle-bars 51.

Referring now to Figure 3, the supporting arm 14 for the rear wheel is hollow, and the driving shaft 52 extends through it into a gear casing 53 secured to the end of the arm. The gear casing is cylindrical and is enclosed at one end by a plate 55 which is integral with it, and at the other end by a plate 56 which is detachable. These two plates are pro-

vided with ball or roller bearings 57 and 58 in which is rotatably mounted the rear spindle 59. The spindle extends out beyond the bearing 58 and is splined at 60 to receive the hub 61 of the rear wheel. The hub is detachable and is secured in place by the usual securing nut 62. The hub carries a brake-drum 63 and the main part of the wheel 64 is detachably secured to this drum. The usual form of brake mechanism 65 is located within the drum and is operated by a camshaft 66 and lever-link mechanism 67. The spindle 59 has secured to it a bevel gear wheel 68 which is engaged by a bevel pinion 69 fixed to the end of the driving shaft 52.

The engine 12 is preferably of the kind described in the specification of Application 216/42 (Serial No. 555,974), and is a two-cylinder opposed-piston two-stroke, having its cylinders 8 horizontally disposed across the fore-and-aft axis of the vehicle, one on either side of a pump cylinder 9. Two crankshafts are arranged one at either end of the cylinders, and are gear-connected together and to the aforesaid driving shaft 52.

As will be seen from Figures 8 and 9, the vehicle may be arranged as a single-seater or a two-seater. The seat and backrest 70 may be padded and supported by a pressed sheet metal casing carried by a framework, not shown, which is secured directly to the main body of the engine. The sheet-metal casing may be pressed to a suitable shape for the seat and backrest, and may be provided with a scuttle 72, leg-shield 73, front mudguard 74, rear mudguard 75 and a compartment 76 for tools or luggage. The upper edges of the scuttle may support a windscreen 77, and the rear mudguard may be provided with a suitable bracket 78 for a number-plate and rear light. The head-lamp 79 may be supported by the scuttle. The centre part 71 of the casing may be comparatively narrow, and the ends of the engine may project through it. Footrests 80 may be secured to a part of the casing, or in the case of a two-seater, one pair of them may be secured at 81 directly to the engine.

As indicated earlier in the specification, either or each of the arms for the front or rear wheel may be rigidly attached to or formed integral with the engine unit, while the mounting for either wheel is spring-supported at the extremity of its arm. Figures 6 and 7 show such an arrangement as applied to the front wheel mounting. The arm 13 in this instance, instead of being pivotally attached to the engine, is provided with a suitable base piece which is

bolted to the engine by bolts which pass through it, through the engine, and through a similar base plate for the rear wheel mounting. None of these parts, however, are shown in the drawings. The forward end of the arm 13 is provided with a fork 82 between the arms of which a pivot sleeve 83 is clamped by a bolt 84 which passes through it and the arm and is provided at its extremities with clamping nuts 85. The sleeve and bolt pass through a bore in a hub member 86 which may be bushed, and the sleeve and bolt may be slightly inclined to the vertical in order to provide the usual castor action for the wheel. The hub member is also provided with a horizontally extending housing 87 to one side of said upright bore in which are located ball-bearings 88 which support the wheel spindle 89. The spindle is secured to or formed integrally at one end with a hub-plate 90 and is screw-threaded on the other end to receive a nut 91 which prevents the spindle from being withdrawn from the ball-bearings. The ball-bearings in their turn are held between shoulders 92 on the hub member and a shoulder 93 on the spindle and the aforesaid nut 91. It will be noted that the span of the fork member 82 is considerably greater than the height of the hub member and two helical springs 94 and 95 encircle the sleeve 83 between the hub member and the forked arm. The spring 94 constitutes the main supporting spring for the vehicle, while the spring 95 constitutes a snubber spring. With this arrangement, the hub member 86 can slide up and down the steering sleeve 83 and may be rotated about the sleeve by means of a similar steering lever 40 and steering link 42, described with reference to Figures 1 and 2.

Secured to the aforesaid spindle-plate 90 is a brake-drum 96, while the brake mechanism 97 is carried by the hub 86. Secured to the brake drum is a disc type of wheel 98 which is so shaped as to bring the centre of the tyre into line with the axis of the steering sleeve 83.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. A motorcycle wherein the front and/or rear wheels is or are each supported by an arm or the like extending in a fore-and-aft direction along one side of the wheel only and attached directly to the engine unit which unit is sufficiently strongly constructed to withstand the road shocks which are thus transmitted to them, and spring means asso-

ciated with said arms.

2. A motorcycle according to Claim 1, wherein either or each said arm is pivotally secured to the engine unit or to said member or members, and spring means are provided for resisting the pivotal movement.

3. A motorcycle according to Claim 2, wherein said spring means comprise a torsion rod secured at one end to said arm and extending transversely thereto through a bearing and fixed and secured at the other end to the engine unit.

4. A motorcycle according to Claim 1, wherein either or each said arm may comprise a cantilever spring anchored rigidly at one end to the engine.

5. A motorcycle according to Claim 1 wherein either or each arm is rigidly attached to said engine unit or the like and the spring means are arranged at or near the extremity between it and the wheel mounting.

6. A motorcycle according to any of the preceding claims, wherein the arm for the front wheel carries at its forward end a steering head such as a pivotally-mounted stub axle operated from an upwardly-extending steering column through lever-link mechanism.

7. A motorcycle according to any of the preceding claims wherein there is provided a steering head, comprising a wheel spindle arranged to rotate with the wheel, a bearing member carrying said spindle, an upright steering pivot rotatably mounted in said bearing to one side of said spindle and extending above and below it, a rod wherein said arm is provided with a forked member which carries the extremities of said spindle and wherein means are provided for rotating the hub member relatively to the forked member.

8. A motorcycle according to Claim 7, wherein the limbs of the forked member are spaced away from the hub member and wherein spring means are arranged on either side of the hub member between it and the said limbs, which bearing member, steering pivot and limbs of the forked member are so arranged as to permit movement of the hub member between the limbs along the axis of the steering pivot.

9. A motorcycle according to Claim 8, wherein the steering pivot is fixed to the limbs of the forked member, and the hub member is axially slidable upon it.

10. A motorcycle according to any of Claims 7 to 9 wherein there is provided a wheel in which the rim is so disposed in relation to the part connecting it to the spindle that the central plane of the rim contains the pivot axis.

11. A motorcycle according to any of the preceding claims, wherein the arm for the rear wheel is hollow and has a driving shaft extending therethrough
5 between the engine and the rear axle.

12. A motorcycle according to any of the preceding claims, wherein a hollow sheet metal body is secured to the engine unit and is arranged to support the
10 driver's seat.

13. A motorcycle according to Claim 12, wherein said hollow sheet metal body is

provided with a scuttle and wind-screen, together with leg-guards.

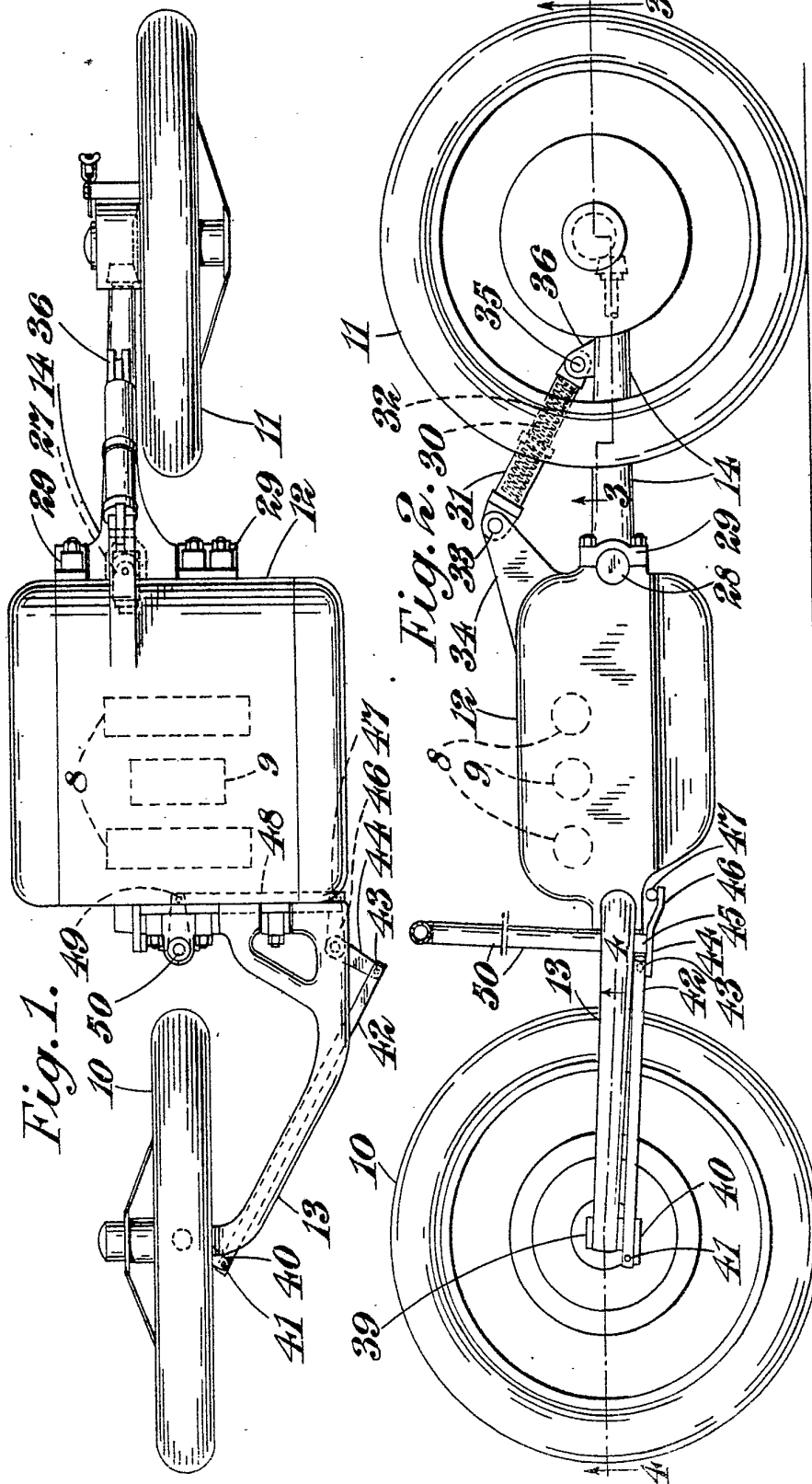
14. A motorcycle substantially as
15 described with reference to the accompanying drawings.

Dated this 5th day of February, 1943.

BOULT, WADE & TENNANT,
111 & 112, Hatton Garden,
London, E.C.1,
Chartered Patent Agents.

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[This Drawing is a reproduction of the Original on a reduced scale.]



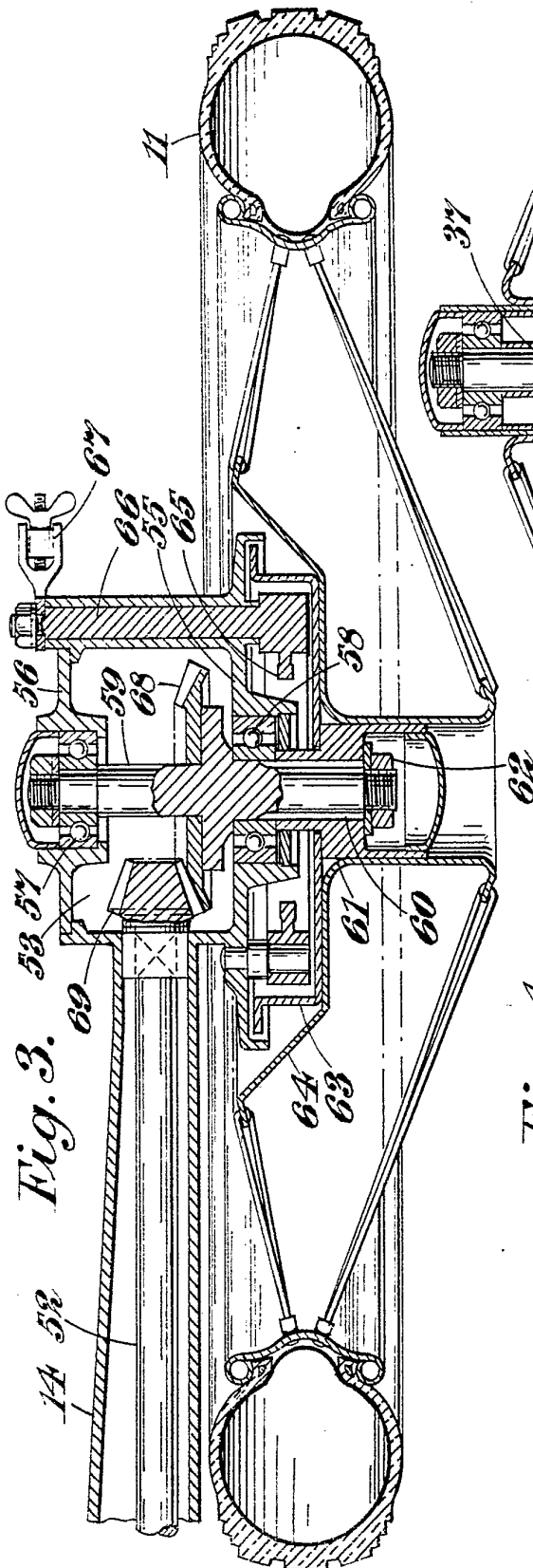
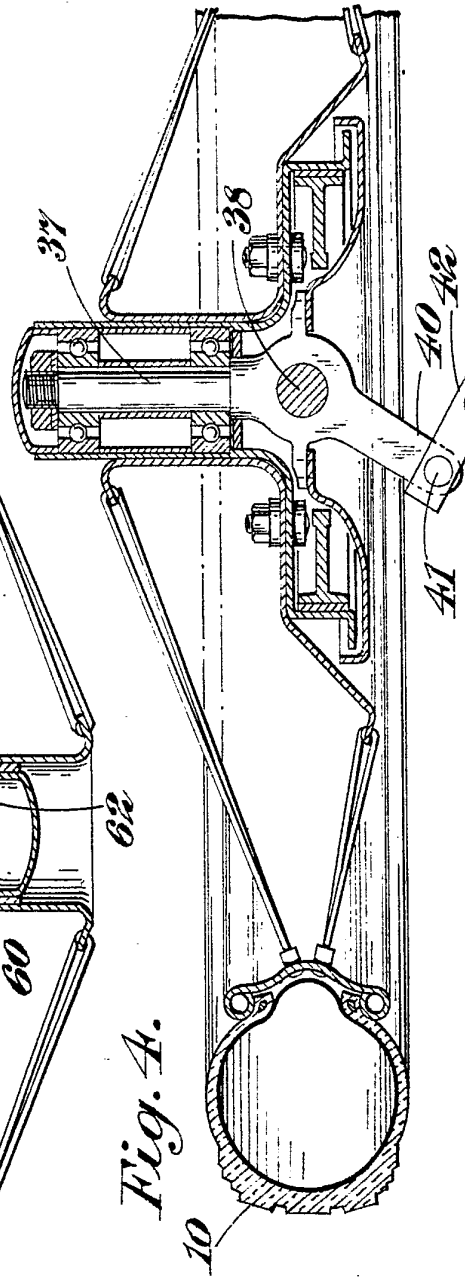
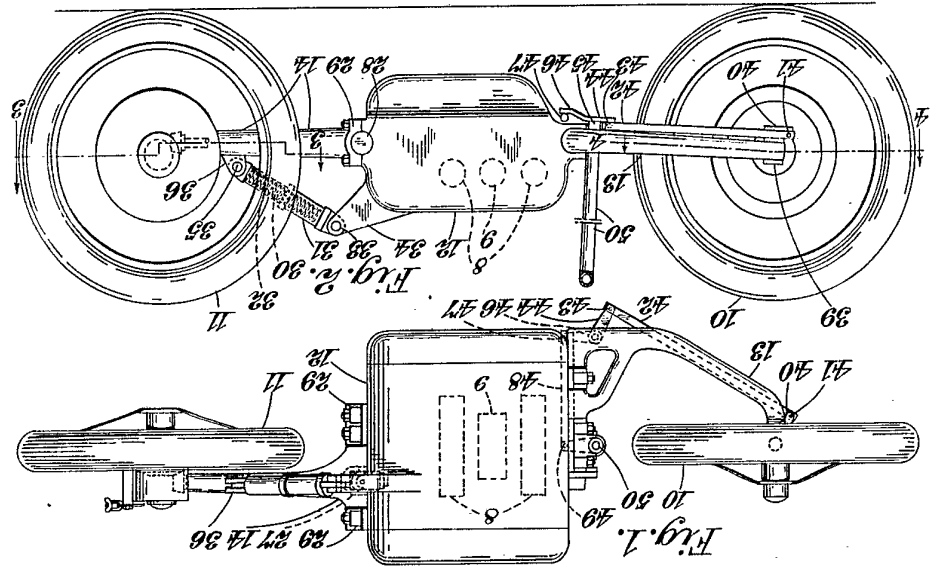


Fig. 4.





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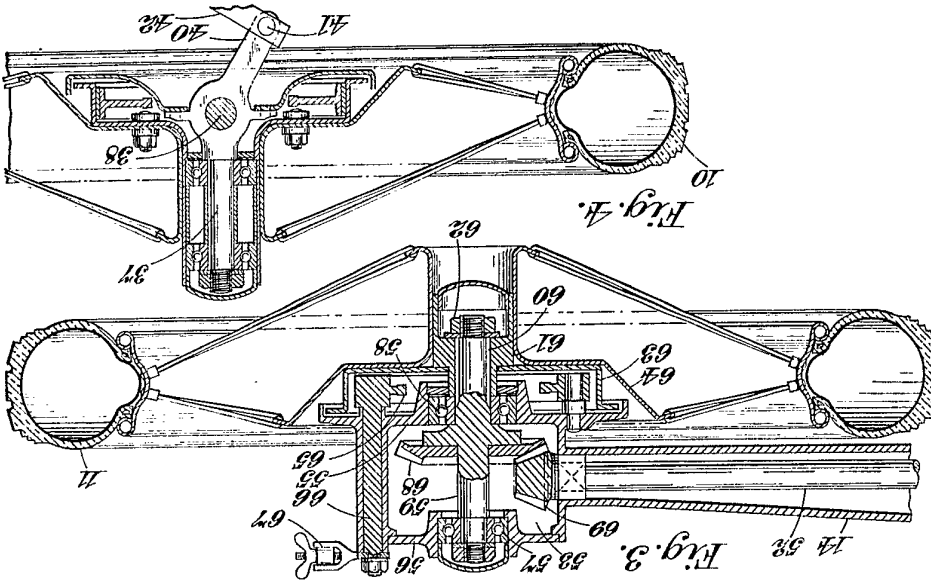
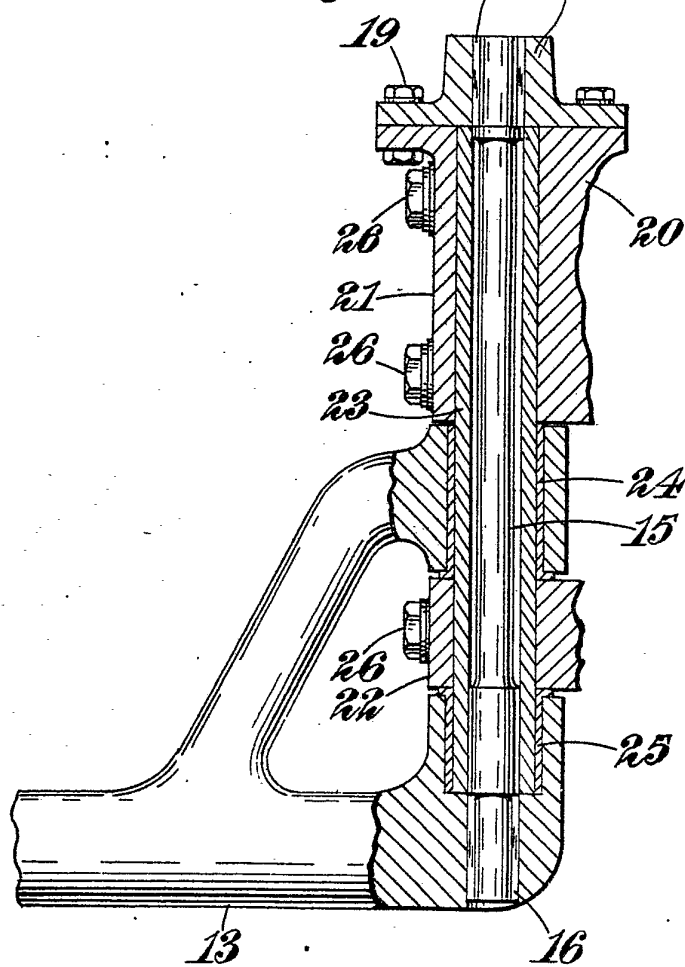
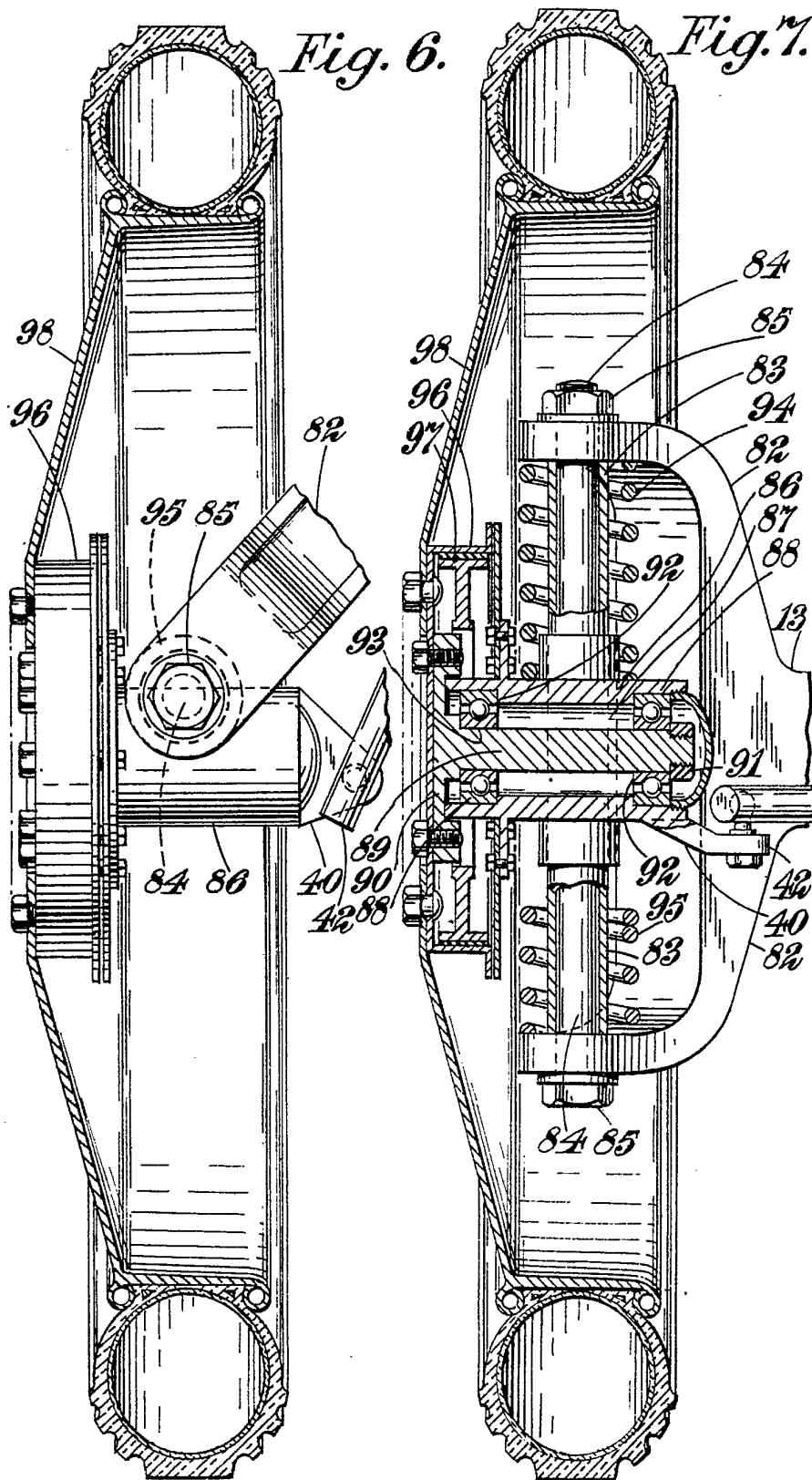
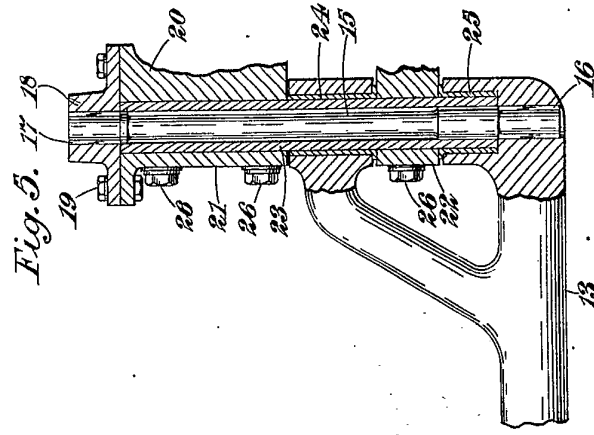
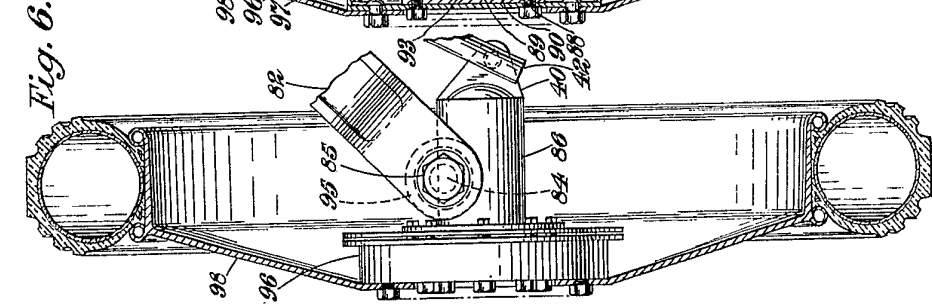
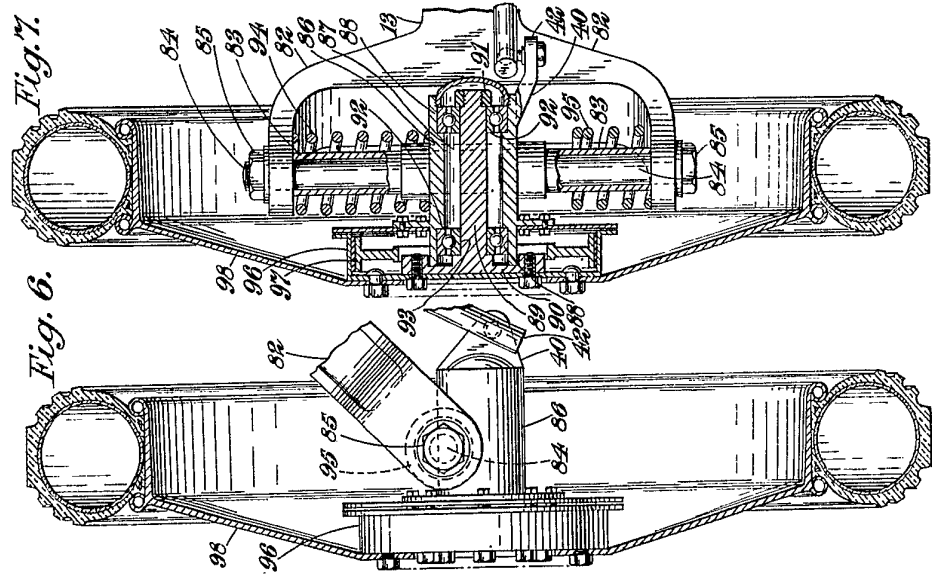


Fig. 5.

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