

PATENT SPECIFICATION

326,577



Application Date: Dec. 21, 1928. No. 37,847/28.

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PROVISIONAL SPECIFICATION.

No. 37,847, A.D. 1928.

Improvements relating to Spring Suspensions for Motor-cycles.

We, MATCHLESS MOTOR CYCLES (COLLIERS) LIMITED, of Plumstead Road, Plumstead, London, S.E. 18, a British Company, and HENRY ALBERT COLLIER, of Belsaye, Shooters Hill, Plumstead, London, S.E. 18, of British Nationality, do hereby declare the nature of this invention to be as follows:—

This invention relates to spring suspensions for the rear wheels of motor cycles, of the type in which the rear wheel is mounted upon a frame hingedly mounted upon the main frame, a helical spring or like damping device being interposed between the upper end of the rear frame and the main frame.

The invention has among its objects to provide only two working joints, in neither of which are there any metallic parts in contact, and generally to provide a simple and effective rear wheel suspension that is well adapted to meet practical requirements.

According to the invention the rear wheel frame is hingedly mounted within bearings provided in the main frame or some part thereof, one part of each bearing being clamped within the main frame or a part thereof while the other part of each bearing is fixedly held by the rear frame, and a non-metallic elastic sleeve interposed between these respective parts, which is deformed in the movement of the rear frame without any sliding movement being involved.

According to the invention moreover, the upper part of the rear frame is connected to the upper end of the main frame by a sliding friction joint or joints adapted as a friction damper device, and to give lateral rigidity to the frame.

According to the invention moreover, the rearwardly extending silencer is adapted to be anchored or stayed in such manner as to ensure its lateral stability, by the provision of a member supported for example at or near the lower end of the main frame and extending outwardly and rearwardly at an inclination where-

by its opposite rear end may be secured to the rearwardly extending silencer and thus a triangular formation of the respective parts in a horizontal plane is simply secured.

The invention comprises the features which are hereinafter described.

In carrying the invention into effect according to one construction we provide the rear frame of two substantially symmetrical frame parts of a triangular form to which the mud-guard, carrier, stand, and chain guard may all be rigidly secured. At the lower end in front each of the rear frame parts is provided with a fitting having an integral boss which is split and adapted in the usual manner to be tightened up by transversely disposed bolts for the reception of the bearing which may be provided as a tubular part securely clamped within the respective fitting. The main frame at or near its lower end is provided with a corresponding transversely disposed part or lug with reduced outwardly extending ends upon each of which a bearing conveniently provided as a tubular part is fixedly secured, and the respective outwardly extending reduced ends having the bearing or tubular part mounted upon them are set within the bearings or tubular parts clamped within respective ends of the rear frame parts. An elastic or rubber sleeve is mounted between the respective bearings or tubular parts referred to whereby on the partial rotation of the rear frame the elastic or rubber sleeve is deformed and thus no sliding motion is involved.

The rear frame parts at their upper ends are respectively provided with fittings or parts forming parallel symmetrical plates that may be respectively disposed beside and externally of two rearwardly extending slotted and parallel plates provided integrally upon or secured to the upper end of the main frame. These latter plates are provided of symmetrical form and mounted on opposite

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the outer faces of the said friction members or washers are mounted metallic washers e^1 of which that adjacent the bridge member is seated against a shoulder or collar upon the stud e , while that on the outer side of the slotted plate of the main frame is adapted to form a seat for a spring washer e^2 or helical spring, by which pressure is applied to secure the desired degree of friction in the friction damper devices by means of adjusting hand nuts e^3 adapted to screw upon the threaded outer extremities of the said studs.

In order to permit the friction members or washers e^1 to be adjusted in position exactly to suit the distance between the slotted plates c^2 of the main frame it is only necessary that the clip bolts a^3 of the bridge member should be slackened before the hand nuts e^3 are adjusted to give the frictional pressure desired; the clip bolts may then be tightened to secure the friction damper devices rigidly to the bridge member a^1 . Such an adjustment will require to be effected only at infrequent intervals as wear takes place in the friction members or washers. It will be observed that errors of alignment in the building of the rear frame do not affect the operation of the spring suspension, since the bridge member is free to take up any position laterally within the limits of clearance which are allowed between the end faces of the bridge member and the shoulders or collars of the studs.

Two helical springs g are mounted between suitable lugs or fittings provided upon the upper member c^3 of the main frame c and upon the upper part of the rear frame adjacent the bridge member a^1 .

In the construction represented in Figures 3 and 4 the upwardly extending members of the rear frame part at their upper ends are respectively provided with fittings or parts a^4 forming parallel symmetrical plates that may be respectively disposed beside and externally of the two rearwardly extending slotted and parallel plates c^2 provided integrally upon or secured to the upper end of the main frame.

Each of the respective fixed parallel plates a^4 of the rear frame is disposed adjacent one of the rearwardly extending slotted plates c^2 of the main frame, and the respective sets of parts are each connected to form a friction joint at each side of the frame. For this purpose the respective sets of plates may be connected together by means of a transversely disposed pin h , and friction discs f provided respectively between the fixed and movable plates of each set and at each

side of the fixed plates, the whole being connected together by means of a pin and nut device so as thus to impose friction at each side of the fixed plate of each set, there being provided for each joint an outwardly extending pressure adjusting hand nut e^3 at each side of the frame, and a spring washer e^4 or helical spring interposed as a means for applying varying pressure between the plates and discs.

It will be understood that the friction joints at each side may be interconnected.

The respective rear frame parts are connected together near their upper ends and in position beneath the slotted rearwardly extending plates referred to, by means of a transversely disposed rod a^5 on which the ends of the respective helical springs g may be anchored, the opposite ends of which are carried by suitable fittings upon the main frame, the rod referred to being advantageously provided in a central position with a rubber sleeve or buffer a^6 at the position opposite to that of the seat tube of the main frame. Thus, in addition to the resistance of the helical springs, frictional resistance is imposed that may be adjustable according to practical requirements.

The silencer i is conveniently supported independently of the rear frame by means of a plate i^1 extending rearwardly and outwardly and secured to the main frame at two points i^2 disposed at different levels.

It will be understood that the invention may be carried into effect with any other construction than that hereinbefore specifically described. Thus the rear frame may be hingedly connected to the main frame by the use of any other construction in which a rubber or other elastic sleeve is provided which is adapted to permit of relative movement of the parts of the bearings without sliding motion and that similarly any other construction of friction joint may be provided at the upper part of the connected frames adapted for operation in the manner and for the purposes described.

The means employed for connecting the exhaust pipe may be used for securing the end of the stay provided for the support of the outwardly extending silencer in the manner hereinbefore described.

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. Spring suspensions for the rear wheels of motor cycles of the type described, wherein the rear wheel frame is hingedly mounted within bearings provided in the main frame or some

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frame, and a non-metallic elastic sleeve interposed between these respective parts, which is deformed in the movement of the rear frame without any sliding movement being involved.

According to the invention, moreover, the upper part of the rear frame is connected to the upper end of the main frame by a sliding friction joint or joints adapted as a friction damper device, and to give lateral rigidity to the frame.

According to the invention, moreover, the two symmetrical frame parts of the rear frame are rigidly connected at the upper end by a bridge member, which is disposed between slotted parallel plates of the main frame, with the slots of which it is engaged by a friction damper device at each side, such devices being capable of adjustment in a direction towards and away from the bridge member and of being secured thereon in the adjusted positions.

According to the invention, moreover, the rearwardly extending silencer is adapted to be anchored or stayed in such manner as to ensure its lateral stability, by the provision of a member supported for example at or near the lower end of a main frame and extending outwardly and rearwardly at an inclination whereby its opposite rear end may be secured to the rearwardly extending silencer and thus a triangular formation of the respective parts in a horizontal plane is simply secured.

The invention comprises the features which are hereinafter described.

Two constructions of spring suspension according to the invention are illustrated in the accompanying drawings, by way of example.

Figure 1 is a side elevation of the rear part of a motor cycle fitted with one construction of spring suspension.

Figure 2 is a transverse view of the rear frame fitted as shown in Figure 1, to an enlarged scale and showing in section one of the lower pivotal bearings and the friction damper devices of the upper part.

Figures 3 and 4 are respectively views corresponding to Figures 1 and 2 in illustration of a second construction of spring suspension.

Figure 5 is a detail plan view in illustration of the mounting of the silencer.

In carrying the invention into effect according to the construction represented in Figures 1 and 2 of the accompanying drawings, we provide the rear frame of two substantially symmetrical frame parts *a* of a triangular form to which the mud-guard, carrier, stand, and chain guard may all be rigidly secured. At

the lower end in front each of the rear frame parts is provided with a fitting *b* having an integral boss *b*¹ which is split and adapted in the usual manner to be tightened up by transversely disposed bolts *b*² for the reception of the bearing which may be provided as a tubular part *b*³ securely clamped within the respective fitting. The main frame *c* at or near its lower end is provided with a corresponding transversely disposed part *c*¹ or lug with reduced outwardly extending ends upon each of which a bearing *c*² conveniently provided as a tubular part is fixedly secured, and the respective outwardly extending reduced ends having the bearings or tubular parts *c*² mounted upon them are set within the bearings or tubular parts *b*³ clamped within the respective ends of the rear frame parts. An elastic or rubber sleeve *d* is mounted between the respective bearings or tubular parts referred to whereby on the partial rotation of the rear frame the elastic or rubber sleeve is deformed and thus no sliding motion is involved.

The two upwardly extending members of the frame parts of the rear frame are rigidly connected together at their upper ends by means of a tubular bridge member *a*¹ provided with suitable socket connections to receive the upper ends of the said members. The bridge member is provided of such length that it may be disposed between two rearwardly extending slotted and parallel plates *c*² provided integrally upon or secured to the main frame with a considerable degree of clearance space between the said member and the said plates at each side. These latter plates are provided of symmetrical form and mounted on opposite sides at the upper end of the seat tube, being conveniently secured in position by two studs or bolts disposed one beneath the other, the slots provided in these plates being concentrically formed with the hingeing axis of the rear frame as a centre. The sliding friction joints, adapted to act as friction damper devices, are formed by means of studs *e* which are slidably fitted into the ends of the bridge member *a*¹ and are adapted to extend through the slots of the plates *c*² of the main frame. The said studs are adapted to be fixedly secured in any desired position of adjustment by means of clip lugs *a*² provided at the ends of the bridge member and adapted to be tightened by means of bolts or the like *a*³. The friction devices are formed by non-metallic friction members or washers *f* disposed on each side of each of the slotted plates *c*² of the main frame and threaded on the studs *e* before referred to. Against

substantially symmetrical frame parts of triangular form of the rear frame, are rigidly connected together at their upper ends by means of a tubular bridge member provided with suitable socket connections to receive the upper ends of the said members. The bridge member is provided of such length that when disposed between the slotted plates of the main frame there is a considerable degree of clearance space between the said member and the said plates at each side. The sliding friction joints, adapted to act as friction damper devices, are formed by means of studs which are slidably fitted into the ends of the bridge member and are adapted to extend through the slots of the plates of the main frame. The said studs are adapted to be fixedly secured in any desired position of adjustment by means of clip lugs provided at the ends of the bridge member and adapted to be tightened by means of bolts or the like. The friction devices are formed by non-metallic friction members or washers disposed on each side of each of the slotted plates of the main frame and threaded on the studs before referred to. Against the outer faces of the said friction members or washers are mounted metallic washers of which that adjacent the bridge member is seated against a shoulder or collar upon the stud, while that on the outer side of the slotted plate of the main frame is adapted to form a seat for a spring washer or helical spring, by which pressure is applied to secure the

desired degree of friction in the friction damper devices by means of adjusting hand nuts adapted to screw upon the threaded outer extremities of the said studs. 40

In order to permit the friction members or washers to be adjusted in position exactly to suit the distance between the slotted plates of the main frame it is only necessary that the clip bolts of the bridge member should be slackened before the hand nuts are adjusted to give the frictional pressure desired; the clip bolts may then be tightened to secure the friction damper devices rigidly to the bridge member. Such an adjustment will require to be effected only at infrequent intervals as wear takes place in the friction members or washers. It will be observed that errors of alignment in the building of the rear frame do not affect the operation of the spring suspension, since the bridge member is free to take up any position laterally within the limits of clearance which are allowed between the end faces of the bridge member and the shoulders or collars of the studs. 45 50 55 60 65

It will be understood that the invention is not limited to the particular constructional details that have been hereinbefore described.

Dated this 30th day of July, 1929.
EDWARD EVANS & Co.,
27, Chancery Lane, London, W.C. 2,
Agents for the Applicants.

COMPLETE SPECIFICATION.

Improvements relating to Spring Suspensions for Motor-cycles.

We, MATCHLESS MOTOR CYCLES (COLLIERS) LIMITED, of Plumstead Road, Plumstead, London, S.E. 18, a British Company, and HENRY ALBERT COLLIER, of Belsaye, Shooters Hill, Plumstead, London, S.E. 18, of British Nationality, 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 spring suspensions for the rear wheels of motor cycles, of the type in which the rear wheel is mounted upon a frame hingedly mounted upon the main frame, a helical spring or like damping device being interposed between the upper end of the rear frame and the main frame.

The invention has among its objects to provide only two working joints, in neither

of which are there any metallic parts in contact, to provide improved means for connecting the upper part of the rear frame to the upper end of the main frame, to facilitate the correction of want of alignment between the two frames, to permit adjustment for the width of the frames to be readily effected and to ensure that when such adjustment is made lateral rigidity is secured at the sliding frictional joint, and generally to provide a simple and effective rear wheel suspension that is well adapted to meet practical requirements. 95 100

According to the invention the rear wheel frame is hingedly mounted within bearings provided in the main frame or some part thereof, one part of each bearing being clamped within the main frame or a part thereof while the other part of each bearing is fixedly held by the rear 105 110

sides at the upper end of the seat tube being conveniently secured in position by two studs or bolts disposed one beneath the other, the slots provided in these plates being concentrically formed with the hinging axis of the rear frame as a centre.

Each of the respective fixed parallel plates of the rear frame is disposed adjacent one of the rearwardly extending slotted movable plates of the main frame, and the respective sets of parts are each connected to form a friction joint at each side of the frame. For this purpose the respective sets of plates may be connected together by means of a transversely disposed pin, and friction discs provided respectively between the fixed and movable plates of each set and at each side of the fixed plates, the whole being connected together by means of a pin and nut device so as thus to impose friction at each side of the fixed plate of each set, there being provided for each joint an outwardly extending pressure adjusting hand nut at each side of the frame, and a helical spring interposed as a means for applying varying pressure between the plates and discs.

The respective rear frame parts are connected together near their upper ends and in position beneath the slotted rearwardly extending plates referred to, by means of a transversely disposed rod on which the ends of the respective helical springs may be anchored, the opposite

ends of which are carried by suitable fittings upon the main frame, the rod referred to being advantageously provided in a central position with a rubber sleeve at the position opposite to that of the seat tube of the main frame. Thus in addition to the resistance of the helical springs, frictional resistance is imposed that may be adjustable according to practical requirements.

It will be understood that the friction joint at each side may be interconnected.

It will be understood that the invention may be carried into effect with any other construction than that hereinbefore specifically described. Thus the rear frame may be hingedly connected to the main frame by the use of any other construction in which a rubber or other elastic sleeve is provided which is adapted to permit of relative movement of the parts of the bearings without sliding motion and that similarly any other construction of friction joint may be provided at the upper part of the connected frame adapted for operation in the manner and for the purposes described.

The means employed for connecting the exhaust pipe may be used for securing the end of the stay provided for the support of the outwardly extending silencer in the manner hereinbefore described.

Dated this 21st day of December, 1928.

EDWARD EVANS & Co.,

27, Chancery Lane, London, W.C. 2,
Agents for the Applicants.

PROVISIONAL SPECIFICATION.

No. 23,414, A.D. 1929.

Improvements relating to Spring Suspensions for Motor-cycles.

We, MATCHLESS MOTOR CYCLES (COLLIERS) LIMITED, of Plumstead Road, Plumstead, London, S.E. 18, a British Company, and HENRY ALBERT COLLIER, of Belsaye, Shooters Hill, Plumstead, London, S.E. 18, of British Nationality, do hereby declare the nature of this invention to be as follows:—

This invention relates to spring suspensions for the rear wheels of motor cycles, such as are described in the Specification of our Application for Letters Patent No. 37,847/28.

The present invention has among its objects to provide improved means for connecting the upper part of the rear frame to the upper end of the main frame, to facilitate the correction of want of alignment between the two frames, to permit adjustment for the width of the

frames to be readily effected and to ensure that when such adjustment is made lateral rigidity is secured at the sliding frictional joint.

According to the invention the two symmetrical frame parts of the rear frame are rigidly connected at the upper end by a bridge member, which is disposed between slotted parallel plates of the main frame, with the slots of which it is engaged by a friction damper device at each side, such devices being capable of adjustment in a direction towards and away from the bridge member and of being secured thereon in the adjusted positions.

The invention comprises the features which are hereinafter described.

In carrying the invention into effect according to one construction, the two upwardly extending members of the two

- part thereof and is adapted for pivotal movement relatively to the main frame by the provision of a non-metallic elastic sleeve interposed between the respective bearing parts, which sleeve is deformed in the pivotal movement of the rear frame without any sliding or frictional movement being involved, substantially as hereinbefore described.
2. Spring suspensions for the rear wheels of motor cycles as set forth in claim 1, wherein the upper part of the rear frame is connected to the upper end of the main frame by a sliding friction joint or joints adapted as a friction damper device, substantially as hereinbefore described.
3. Spring suspensions for the rear wheels of motor cycles as set forth in claim 2, wherein the upper part of the rear frame is provided with a bridge member in which the friction damper devices affording the means of connection to the main frame by a sliding friction joint are adjustably mounted, substantially as hereinbefore described.
4. Spring suspensions for the rear wheels of motor cycles, as set forth in claim 2 or 3, wherein the friction damper devices comprise friction discs carried by the rear frame and engaging members of the main frame in such manner as to give a frictional joint, the pressure of the friction discs being adapted to be regulated, substantially as hereinbefore described.
5. Spring suspensions for the rear wheels of motor cycles, as set forth in the preceding claim, wherein the members of the main frame comprise parallel slotted plates within which are disposed studs carried by the rear frame parts and fitted with the friction discs, substantially as hereinbefore described.
6. Spring suspensions for the rear wheels of motor cycles, as set forth in any one of the preceding claims, wherein a rearwardly extending silencer is anchored or stayed with respect to the main frame in such manner as to be independent of the rear frame and to provide a triangular formation of the respective parts in a horizontal plane, substantially as hereinbefore described.
7. A spring suspension for the rear wheels of motor cycles, substantially as hereinbefore described with reference to and as shown in Figures 1 and 2 of the accompanying drawings.
8. A spring suspension for the rear wheels of motor cycles, substantially as hereinbefore described with reference to and as shown in Figures 3 and 4 of the accompanying drawings.

Dated this 20th day of September, 1929.

EDWARD EVANS & Co.,

27, Chancery Lane, London, W.C. 2.
Agents for the Applicants.

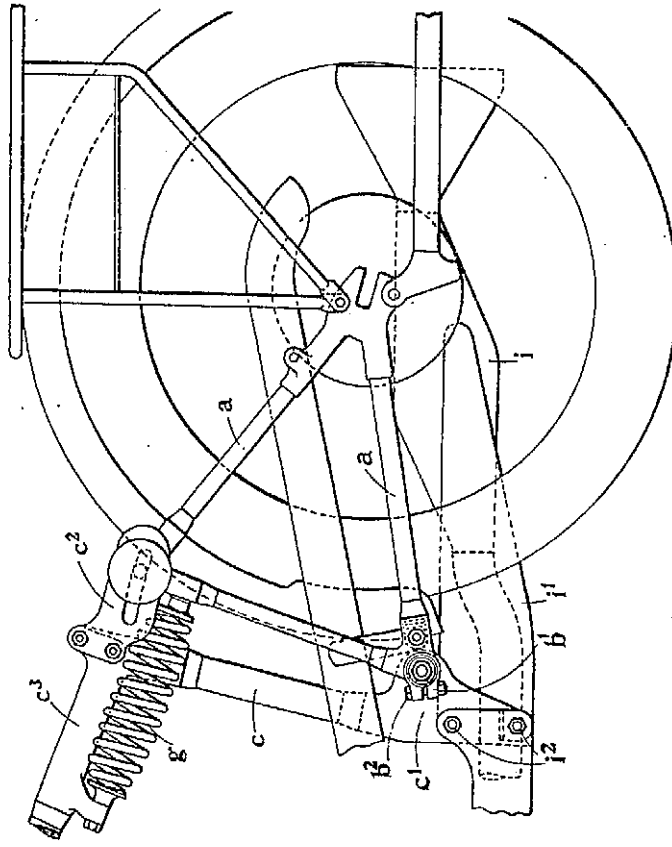


Fig. 1.

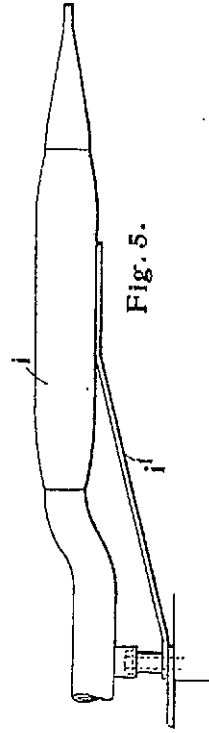


Fig. 5.

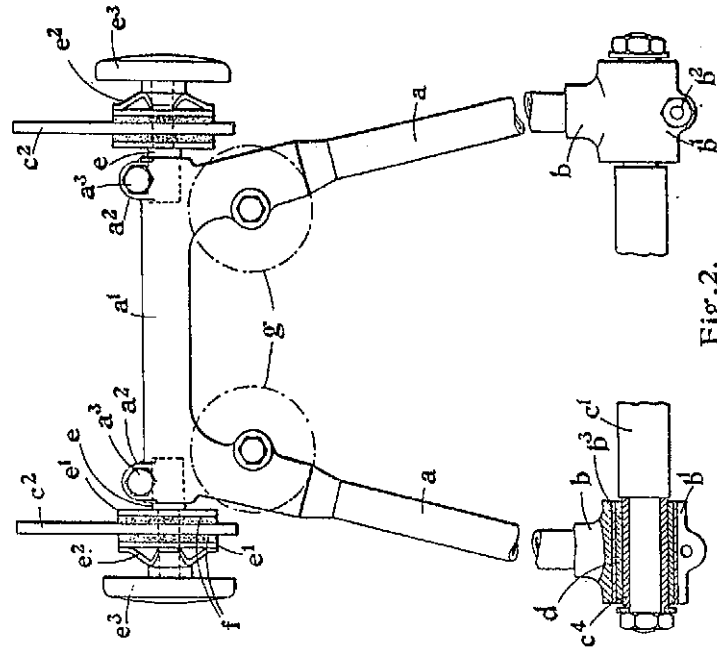


Fig. 2.

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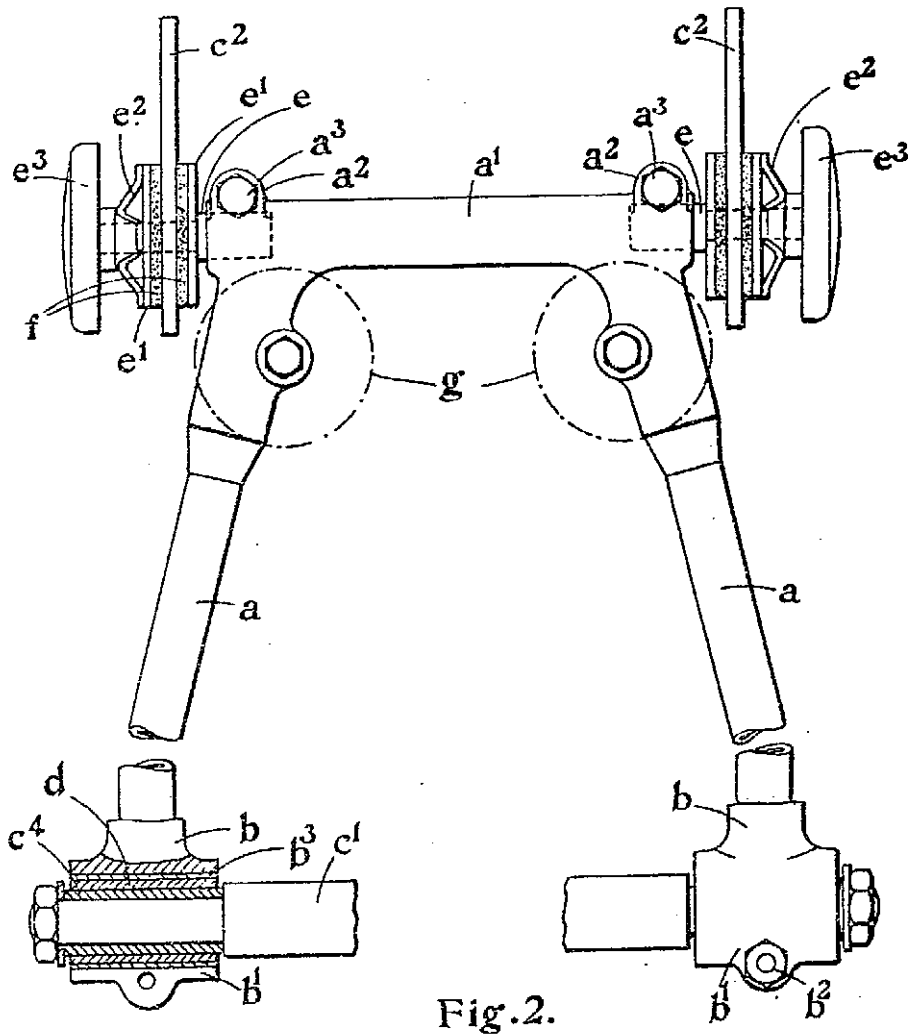
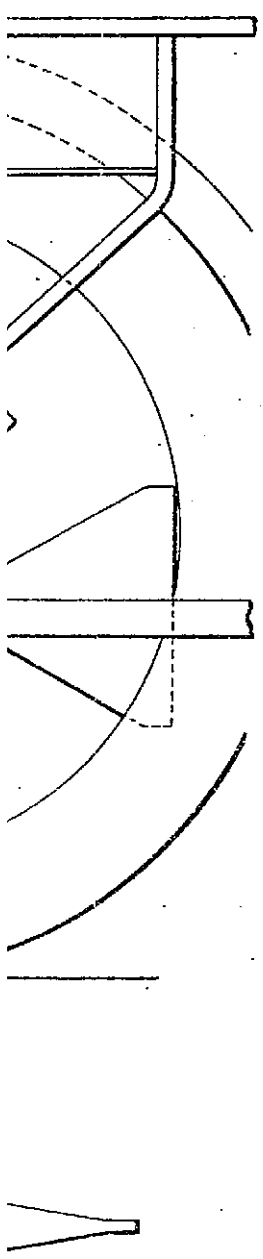


Fig. 2.

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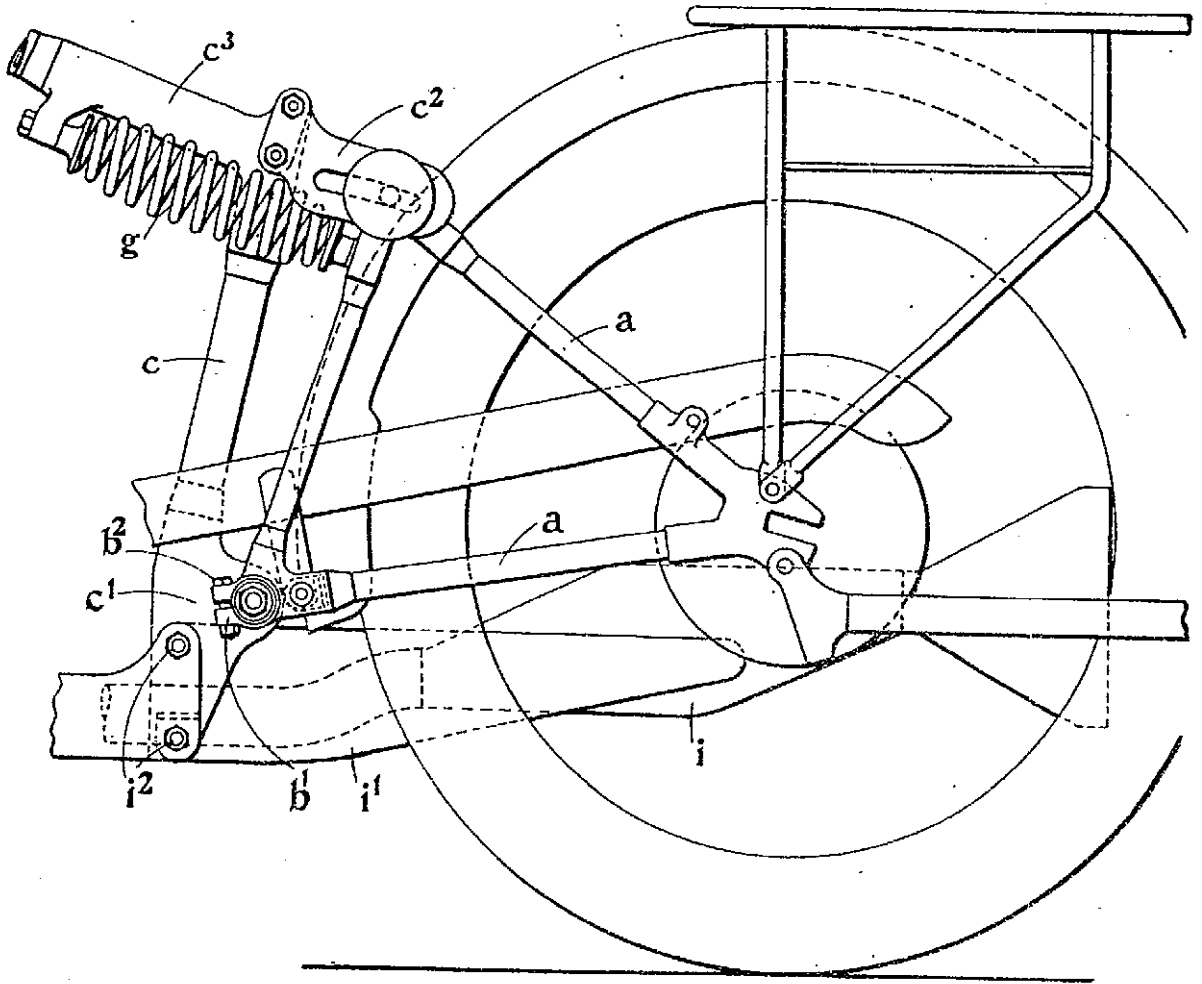


Fig. 1.

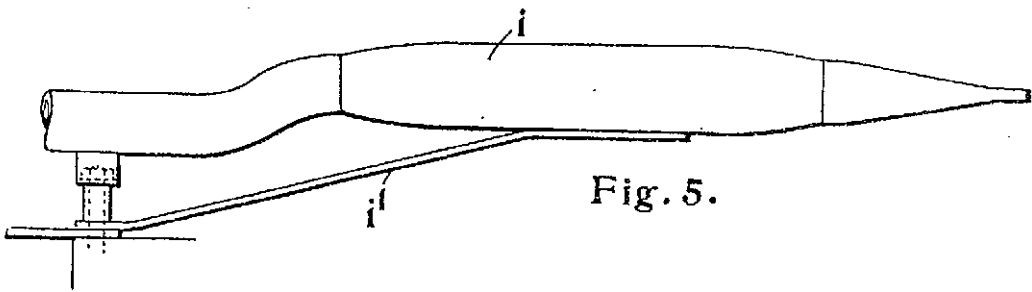


Fig. 5.

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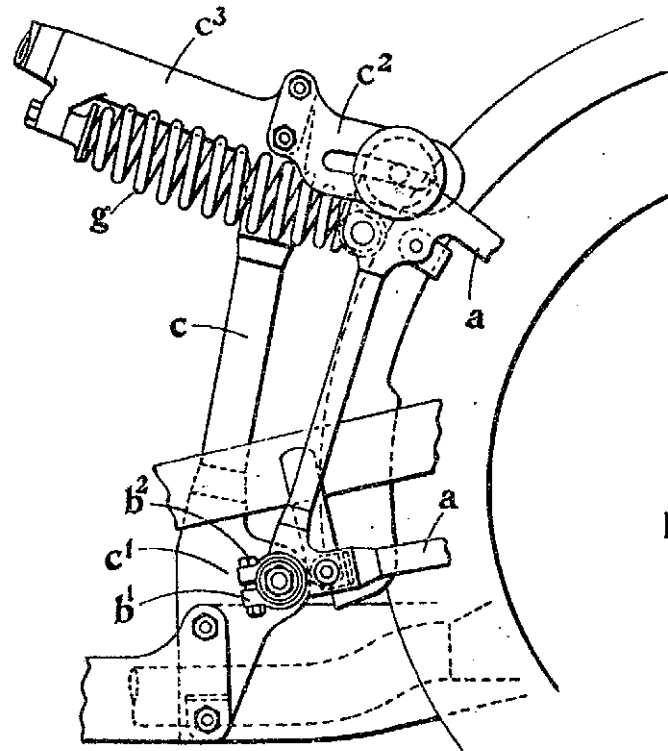


Fig. 3.

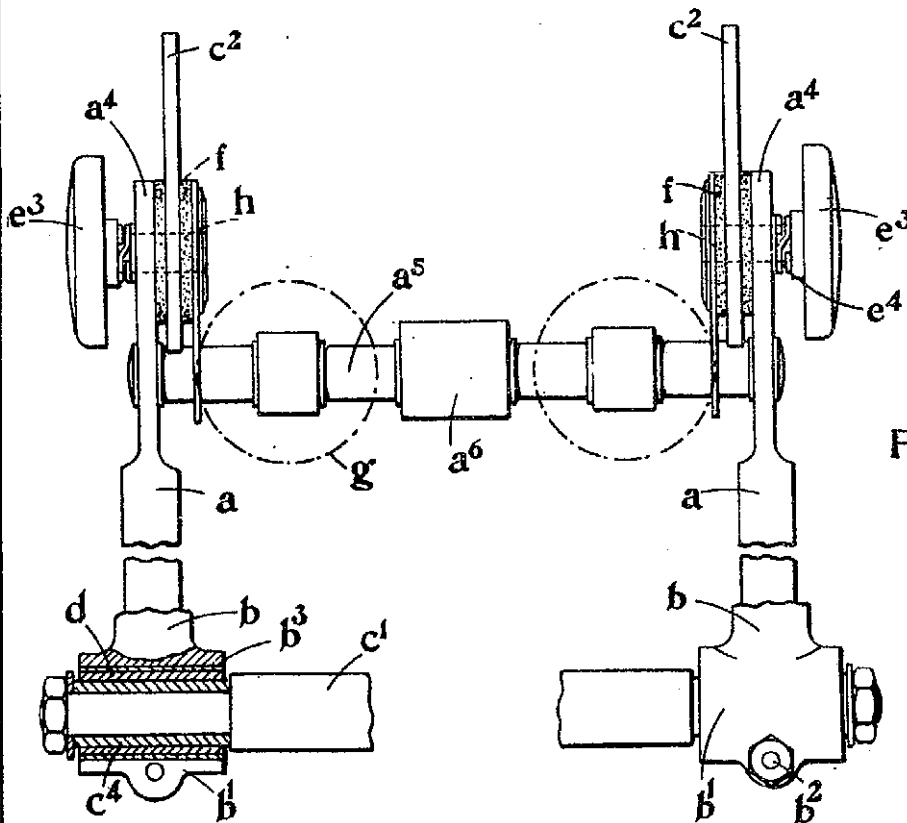


Fig. 4.