PATENT SPECIFICATION

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COMPLETE SPECIFICATION

Improvements in or relating to Transmission Gear Casings of Power-Driven Agricultural Vehicles

We, THOMAS ARTHUR HILL, a British subject, of 20, Gladstone Terrace, Grantham, Lincolnshire, and BARFORD (AGRICULTURAL) LIMITED, a British Company, of Grantham, Lincolnshire, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to agricultural vehicles and is more particularly concerned with such vehicles which although power driven are small enough to be manually guided by a walking operator and have provision for connecting thereto different kinds of tools.

This type of power driven vehicle is advantageously provided with at least one ground-engaging wheel, the hub of which carries a wheel driven from the power unit of the vehicle and normally enclosed by a protective casing which prevents ingress of mud or dirt likely to affect the smooth running of the ground wheel or wheels.

One object of the present invention is to provide an improved construction or mode of assembly of the protective casing so that only partial dismantling thereof is necessary in order to gain access to the driving and driven wheels of the drive from the power unit and in particular to permit the ground wheel together with the power driven wheel to be dismounted as a unit from the slotted ends of the usual mounting stays by which the ground wheel is normally carried. The improved construction also leads to a convenient method of tensioning the chain in the drive from the power unit.

According to the present invention in an agricultural vehicle embodying a power-driven ground-engaging wheel, there is provided a vehicle frame having depending mounting stays in which the hub of said wheel is detachably supported in " drop out " ends, a chain or like flexible drive to the hub, the driving wheel of which drive is supported by the said frame and the driven wheel of which drive is carried by the hub, in combination with a multi-part protective casing for the drive comprising a fixed part, which is secured to the said frame to lie alongside one of the stays and embracing the chain (or like) runs so that its ends cover portions of the said driving and driven wheels respectively, and upper and lower cover parts enclosing the remaining portions of said wheels and movably mounted on the ends of said fixed casing part so that they can be displaced longitudinally of the fixed casing part to give access to the said driving and driven wheels.

The detachable parts of the casing may be conveniently referred to as upper and lower covers in connection with the protective casing for the chain drive and the casing and drive are disposed substantially vertically. When it is desired to remove the ground wheel from the vehicle, it is merely necessary for the operator to detach the upper and lower casing covers from the fixed casing part, thus giving access to the driving chain which can then be readily disengaged from the chain driven wheel carried by the ground wheel hub. When the ground wheel is released from the " drop-out " ends of the mounting stays, the lower open end of the casing permits the ground wheel together with the chain driven wheel carried by the hub to be dropped clear as a unit from the slotted ends.

One of the cover parts and preferably the upper cover part of the protective casing preferably carries internally a chain tensioning member which may be in the form of a curved blade spring so

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disposed that upon application of the upper cover part, the tensioning member extends within the fixed part of the protective casing and presses against one of the chain runs so as to impart driving tension thereto. When the tensioning member is made in the form of a blade spring, the additional advantage is achieved that any slackness in the chain due to wear is automatically taken up. This arrangement contributes to smooth and efficient running of the chain drive.

An apertured part of the casing through which the ground wheel hub extends is preferably provided with a multi-part seal composed, for example, of two semi-cylindrical felt or other absorbent pads held in position by a casing pocket part of which is supported by the lower casing cover either formed on or attached thereto and part of which is supported by the fixed part of the protective casing, e.g. either formed on or attached thereto.

The end of the hub opposite to the chain wheel is preferably provided with a protective cover which prevents ingress of mud or dirt at such end of the hub, this protective cover co-operating with a part of the hub and being removed as a unit therewith when the ground wheel is dismounted.

In order that the invention may be more fully understood reference will now be made to the accompanying drawings which are illustrative of one example of the present invention. In such drawings:

Fig. 1 is a side elevation of part of a power driven agricultural vehicle having a single ground wheel with which is associated dirt excluding devices according to the present invention.

Fig. 2 is a view partly in elevation and partly in section corresponding to Fig. 1, the section being taken on the line II—II thereof.

The vehicle illustrated comprises a framework including horizontally extending, parallel frame bars 1 cross connected by a plurality of bearers 2. The framework supports a pair of forks or mounting stays 3 for a single ground-engaging wheel 4, the hub 5 of which is rotatably supported through the intermediary of metal bushes 6 on a spindle 7 supported at its ends in keyhole slots 8 formed at the lower ends of the forks 3. The front end of the framework supports a power unit, not shown, which may comprise an internal combustion engine which drives into a gear box 9 supported by a pair of the cross bearers 2. The vehicle is intended to be manually guided by a walking operator and for this purpose rearwardly extending handles, not shown, are connected to curved frame members 10. The vehicle is preferably constructed to receive interchangeably various agricultural implements.

The output shaft of the gear box carries a chain wheel 11 from which drive is transmitted by a chain 12 to a chain wheel 13 secured by rivets 14 to a flange 15 formed at one end of the wheel hub 5. This chain drive is protected against ingress of dirt and mud by a protective casing comprising three separable parts composed of an upper semi-cylindrical cover 16 which surrounds the upper half of the chain wheel 11, a lower semi-cylindrical cover 17 which surrounds the lower half of the chain wheel 13 and an intermediate part 18 enclosing the chain runs. The upper and lower covers 16, 17 are detachably connected to the intermediate casing part 18 by retaining elements such as nuts and bolts 19 which clamp together the mutually co-operating flanged parts 20 of the casing. The three parts of the casing are shaped to provide parallel walls 21, 22, Fig. 2. The intermediate casing part 18 is carried by the machine frame. In the example illustrated, one of the cross bearers 2 for the gear box 9 extends through the casing part 18 which is retained between one of the frame members 1 and a lower flange 23 of the gear box as more clearly illustrated in Fig. 2.

The lower casing cover 17 defines with the intermediate or fixed casing part 18 a circular aperture 24 surrounding the adjacent part of the wheel hub 5 and another circular aperture 25 through which one end of the wheel spindle 7 extends. The aperture 24 is provided with a dirt seal composed of semi-circular pads of felt or other absorbent material 26 disposed in semi-cylindrical pockets, one of which 27 is provided on the wall 21 of the lower cover 17 and the other 27^1 of which is provided on the wall 21 of the fixed casing part 18.

The upper casing cover 16 supports internally by means of rivets 28, Fig. 1, a blade spring 29 which extends into the fixed casing part 18 and is curved to serve as a tensioning device for the chain run 30. This blade spring also serves as a means for automatically taking up slackness in the chain due to wear.

The spindle ends 36 are retained in the slotted ends of the forks 3 by means of circular collars 31 which are retained in the circular parts of the keyhole slots 8 by means of nuts 32. The end of the wheel hub 5 remote from the chain wheel 13 is provided with a protective dish-shaped cover 33 located on the spindle end 36 between the adjacent fork 3 and a substantially cone-shaped flange 34 formed on

the hub 5, a washer 35 on the spindle end 36 being positioned between the flat part of the cover 33 and the flanged end 34 of the hub.

The middle part of the bore of the hub 5 between the bushes 6 is of enlarged diameter to provide an oil reservoir 37 which can be replenished through a feed nipple 38 screwed into a radial aperture 39 formed in the hub 5. A nipple 40 is carried by the upper casing part 16 to enable oil to be supplied to the chain 12 as it passes over the chain wheel 11.

When it is desired to remove the wheel 4 from the machine, the cover parts 16 and 17 are detached from the intermediate casing part 18 after removal of the clamping bolts 19, the tensioning spring 29 being simultaneously withdrawn when the outer cover 16 is detached. The chain 12 is now readily accessible to enable it to be removed from the lower chain wheel 13. After the clamping nuts 32 have been removed and the clamping collars 31 withdrawn axially from the spindle ends 36, the wheel spindle 7 can drop out of the keyhole slots 8 at the lower ends of the forks 3. It will thus be seen that in order to permit dismounting of the wheel, only partial dismantling of the protective casing for the chain drive is necessary. The protective cover 33 co-operating with the hub flange 34 is removed as a unit therewith when the ground wheel is dismounted. After the wheel has been placed back and secured in position, the semi-cylindrical casing covers 16, 17 are reconnected to the casing part 18. During such positioning of the upper cover 16, the blade spring 29 is automatically brought into pressing engagement with the chain run 30.

What we claim is:—

1. In an agricultural vehicle embodying a power-driven ground-engaging wheel, the provision of a vehicle frame having depending mounting stays in which the hub of said wheel is detachably supported in " drop out " ends, a chain or like flexible drive to the hub, the driving wheel of which drive is supported by the said frame and the driven wheel of which drive is carried by the hub, in combination with a multi-part protective casing for the drive comprising a fixed part, which is secured to the said frame to lie alongside one of the stays and embracing the chain (or like) runs so that its ends cover portions of the said driving and driven wheels respectively, and upper and lower cover parts enclosing the remaining portions of said wheels and movably mounted on the ends of said fixed casing part so that they can be displaced longitudinally of the fixed casing part to give access to the said driving and driven wheels

2. An agricultural vehicle according to Claim 1, wherein one of the cover parts—preferably the upper one—carries a chain tensioning member which is brought into operative position when the cover part is closed on to the fixed casing part.

3. An agricultural vehicle according to either of the preceding claims, wherein the respective cover parts are detachably mounted on the fixed casing part, and are secured thereto by means of mutually co-operating flanges and retaining elements such as nuts and bolts.

4. An agricultural vehicle according to Claim 2, wherein the tensioning member is in the form of a blade spring which upon application of the cover part extends within the fixed casing part and bears against one of the chain runs.

5. An agricultural vehicle according to any of the preceding claims, wherein an aperture in the protective casing surrounding a part of the ground wheel hub is provided with a multi-part seal, the parts of which are supported by the fixed and associated cover parts respectively.

6. An agricultural vehicle according to Claim 5, wherein the multi-part seal is composed of two semi-cylindrical absorbent pads disposed in a casing packet, one part of which is formed on or attached to the lower casing cover and the other part of which is formed on or attached to the fixed casing part.

7. An agricultural vehicle according to any of the preceding claims, wherein the end of the ground wheel hub opposite to the power driven wheel carried thereby is provided with a protective cover which prevents ingress of mud or dirt, such cover co-operating with a part of the hub and being removed as a unit therewith when the ground wheel is dismounted.

8. A manually guided agricultural vehicle having a single power driven ground wheel and with which is associated dirt or mud excluding devices for the hub and a chain drive therefor, constructed and adapted for use substantially as hereinbefore described with reference to the accompanying drawings.

EDWIN C. AXE, Assoc.I.Mech.E.,
27, Chancery Lane, London, W.C.2,
Agent for the Applicants.

PROVISIONAL SPECIFICATION

Improvements in or relating to Transmission Gear Casings of Power-Driven Agricultural Vehicles

We, THOMAS ARTHUR HILL, a British subject, of 20, Gladstone Terrace, Grantham, Lincolnshire, and BARFORD (AGRICULTURAL) LIMITED, a British Company, of Grantham, Lincolnshire, do hereby declare this invention to be described in the following statement:—

This invention relates to agricultural machines and is more particularly concerned with such machines which although power driven are small enough to be manually guided by a walking operator and have provision for connecting thereto different kinds of tools.

The object of the invention is to improve the general operating characteristics of the machine so as to make them reliable and robust for the heavy nature of the work they are expected to do, and in particular to provide an improved drive to the ground wheel or wheels which while being readily accessible and detachable from the main frame of the machine, is capable of being sealed against the entrance of mud or dirt likely to affect the smooth running of the ground wheel or wheels. The invention is particularly concerned with machines which are carried by a single ground wheel.

According to the invention in an agricultural machine a ground wheel hub carries at one end a chain wheel which is enclosed by a protective case formed as separable parts which enable the hub to be a drop-out fitting in wheel mounting stays.

At the opposite end of the hub there may be a second protective device to exclude mud and dirt and constituted as a part of the hub so that it can be moved as a unit therewith.

In order to ensure the exclusion of dirt and mud, a seal may be provided adjacent the case and the hub and constituted as separable parts so that it may be readily taken apart when the wheel is to be demounted.

The protective case is preferably an elongated structure with top and bottom covers and arranged to accommodate the whole of the chain drive. For the purposes of providing the necessary driving tension to the chain a spring is mounted within the casing so as to press on the chain and thereby to take up the slack. Preferably, the spring is attached to the top cover so as to be removable therewith and is a flat spring which is suitably curved to engage the chain as the cover is placed in position so that there is thus achieved both an automatic tensioning and a wear take-up arrangement which contributes to smooth and efficient running of the drive at all times.

Both top and bottom covers are semi-circular in form and may be attached to the main rectangular portion of the casing by suitable spring-loaded nuts and bolts. The seal between casing and hub may consist of two semi-circular felt or other absorbent pads which wrap about a machined portion of the hub and are held in position by an annular housing. The second protective device at the opposite end of the hub may consist of an annular flange of triangular cross section, and a dished cover member which is fixed to the hub spindle so that the sides of the cover extend over the flange.

For mounting the wheel a spindle extends through the hub and is provided with appropriate bushes one at each end on which the hub rotates. The ends of the spindle are screwed to receive clamping nuts and carry loose locating collars which may be positioned in keyhole shaped slots formed in the bottom ends of the mounting stays, the spindle being clamped, when so located, by means of the nuts. It will be appreciated that when these clamping nuts are released, and after the bottom cover of the chain case and the chain have been disconnected, the collars may be withdrawn axially from the main holes of the slots to allow the screwed ends of the spindles to drop out of the slots.

A practical construction of hub consists of a tube tapering on the outside, towards each end, and with an enlarged diameter at the centre of the inside to provide an oil reservoir which may be replenished through a suitable feed nipple mounted in the wall of the hub. A centre flange to the hub carries the wheel body disc which terminates in a tyre mounting flange. Formed integral with the hub is another pair of flanges, one at each end, the one flange of this pair constituting a mounting for the chain wheel and the other being of triangular cross section to form part of the second protective device aforesaid. Cylindrical bores extend from the reservoir and are lined with bearing

metal to provide for easy rotation on the spindle.

EDWIN C. AXE, Assoc.I.Mech.E.,
27, Chancery Lane, London, W.C.2,
Agent for the Applicants.

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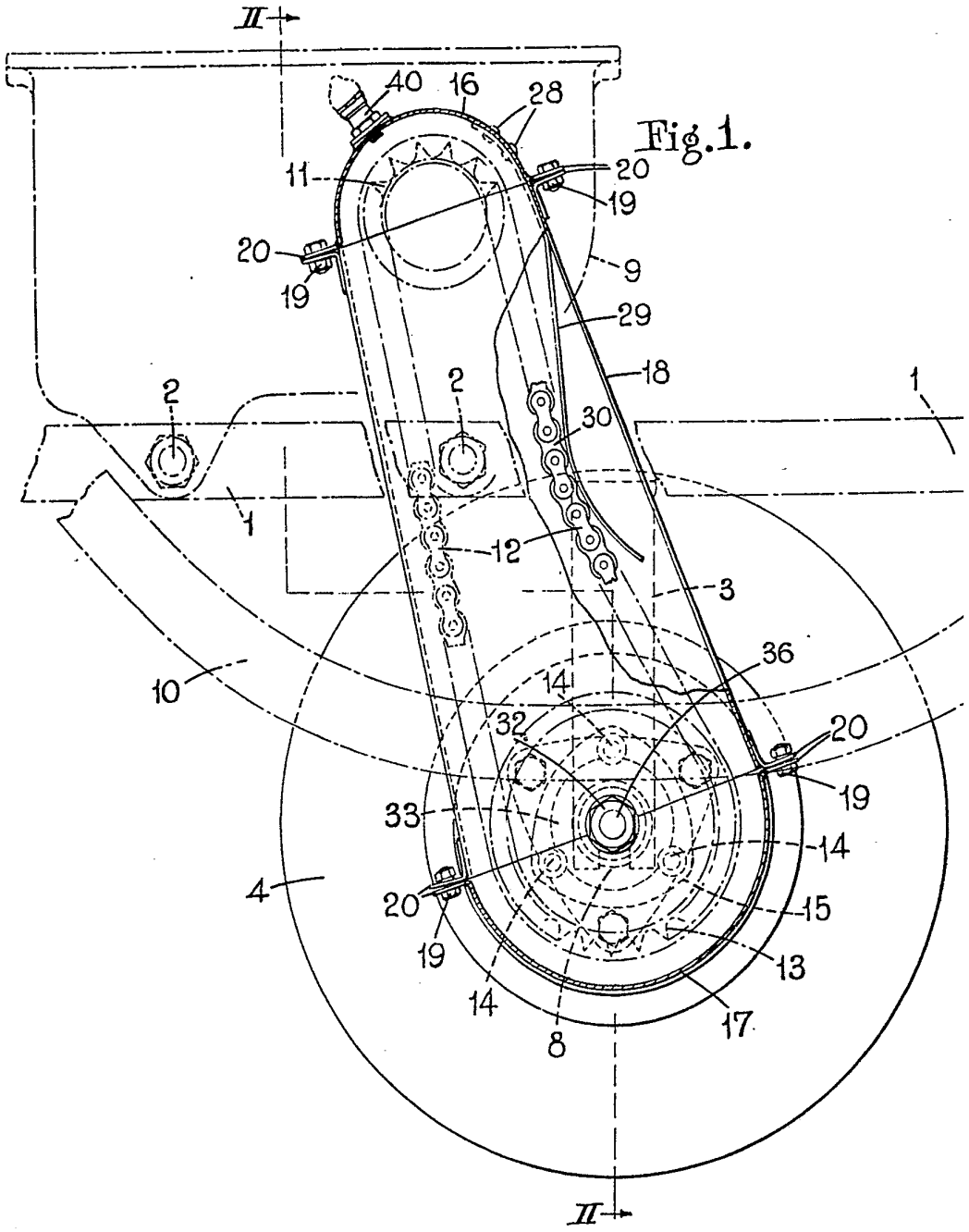
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Fig.1.

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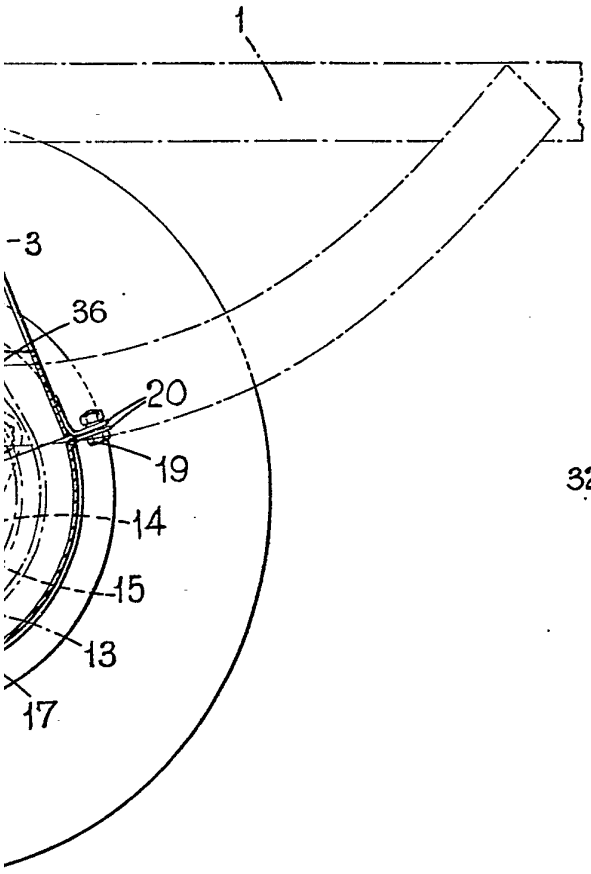

Fig.2.

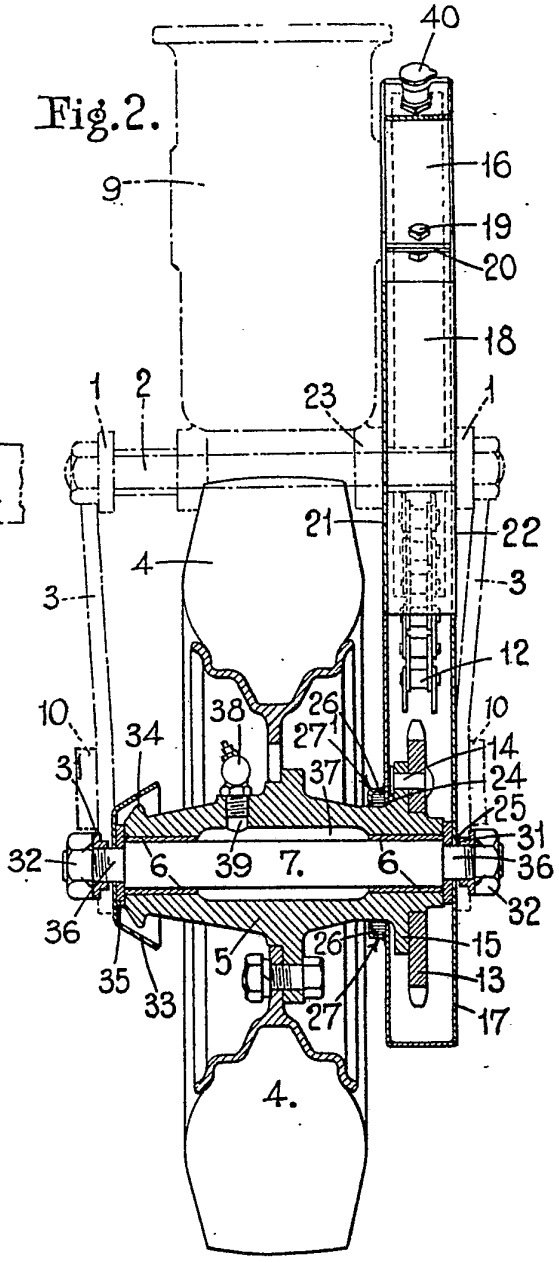

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Fig.1.

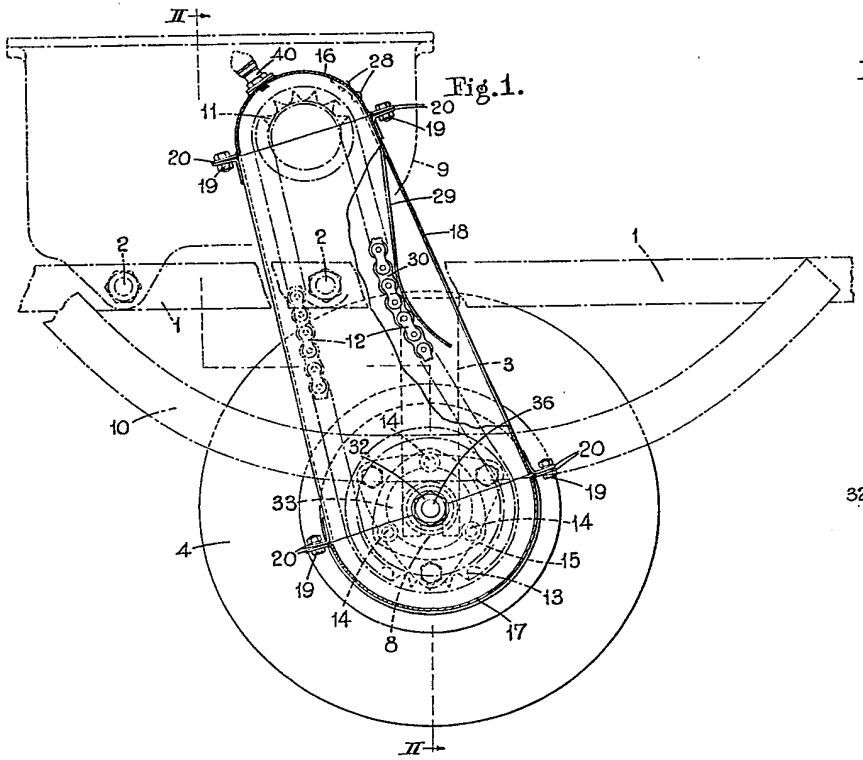

Fig.2.