

PATENT SPECIFICATION



Application Date: Nov. 22, 1935. No. 32354/35.

460,733

" " May 29, 1936. No. 15154/36.

One Complete Specification Left: Nov. 21, 1936.

(Under Section 16 of the Patents and Designs Acts, 1907 to 1932.)

Specification Accepted: Feb. 3, 1937.

ERRATUM

SPECIFICATION No. 460,733.

Page 4, line 50, for "spared" read
"spaced"

THE PATENT OFFICE,
May 19th, 1937.

15 a substantial amount of time to change a wheel.

The object of our invention is to provide an improved form of readily detachable wheel which can be removed and replaced without the use of any tools and in a minimum of time, the various parts being so arranged that there is no risk of the wheel being loosened accidentally.

According to our invention a wheel is adapted to be detachably secured to a brake drum or chain-wheel or to a combined brake-drum and chain-wheel by three or more studs which are parallel to the axis of the wheel and are screwed into the drum or chain-wheel, and the studs after being tightened by the fingers are further tightened and locked by partial rotation of a disc having arcuate slots through which the studs pass. The parts of the disc adjacent to the slots are formed with inclined or cam surfaces so that as the disc is moved angularly these surfaces wedge between the heads of the studs and the surface of the wheel or of spacing sleeves through which the studs pass. The studs are thus simultaneously tightened and locked. Angular movement of the disc in the other direction releases the axial pressure on the studs which can then be unscrewed with the fingers. The disc is conveniently provided with one or more radially projecting lugs for operating it

not essential.

In the case of a motor-cycle wheel fitting between forks the wheel is mounted on ball-bearings housed in the hub shell on a spindle which at one end is held in one side of the fork and at the other end is screwed into a sleeve which is rigidly held in the other side of the fork and which carries the stationary back plate of the brake. The brake drum is rotatably coupled to the sleeve and a spigot on the end of the hub shell is adapted to enter a socket in the inner side of the brake drum.

A short sleeve or collar is slidably keyed on the spindle between the other end of the hub shell and the first side of the fork and a head or nut is provided on this end of the spindle so that the fork can be gripped between the collar and this head or nut. A plate slidably keyed on the collar has a cranked lug or arm which can be engaged with an abutment on the adjacent end of the hub shell but is normally held out of engagement by a spring which urges the plate against the fork.

To detach the wheel the angularly movable disc is first operated to slacken the studs holding the wheel to the brake-drum. The plate is then urged inwardly against the action of the spring and engaged with the abutment on the end of the hub shell. The wheel is thus keyed through the plate and collar to the spindle

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460,733

PROVISIONAL SPECIFICATION

No. 32354 A.D. 1935.

A New or Improved Detachable Wheel for Motor Cycles and the like

We, NORTON MOTORS LIMITED, a British Company, and EDGAR MARTIN FRANKS, British Subject, both of the Company's Works, Bracebridge Street, Birmingham, do hereby declare the nature of this invention to be as follows:—

This invention relates to improvements in detachable wheels for motor cycles and the like. Various forms of readily detachable wheels have been proposed to allow a wheel to be removed and changed in the event of tyre trouble, but all of these necessitate the use of a spanner or some equivalent tool and it usually takes a substantial amount of time to change a wheel.

The object of our invention is to provide an improved form of readily detachable wheel which can be removed and replaced without the use of any tools and in a minimum of time, the various parts being so arranged that there is no risk of the wheel being loosened accidentally.

According to our invention a wheel is adapted to be detachably secured to a brake drum or chain-wheel or to a combined brake-drum and chain-wheel by three or more studs which are parallel to the axis of the wheel and are screwed into the drum or chain-wheel, and the studs after being tightened by the fingers are further tightened and locked by partial rotation of a disc having arcuate slots through which the studs pass. The parts of the disc adjacent to the slots are formed with inclined or cam surfaces so that as the disc is moved angularly these surfaces wedge between the heads of the studs and the surface of the wheel or of spacing sleeves through which the studs pass. The studs are thus simultaneously tightened and locked. Angular movement of the disc in the other direction releases the axial pressure on the studs which can then be unscrewed with the fingers. The disc is conveniently provided with one or more radially projecting lugs for operating it

and there may be provided on a part of the frame of the machine an abutment which can be moved into the path of these lugs so that the disc can be tightened or loosened by moving this abutment into position and rotating the wheel. The studs may be formed with shoulders which will only pass enlargements of the slots at one end so that the studs are normally anchored in and come away with the disc. If desired the disc may carry a spring-pressed detent engaging with serrations or recesses on the wheel to prevent accidental movement of the disc but this is not essential.

In the case of a motor-cycle wheel fitting between forks the wheel is mounted on ball-bearings housed in the hub shell on a spindle which at one end is held in one side of the fork and at the other end is screwed into a sleeve which is rigidly held in the other side of the fork and which carries the stationary back plate of the brake. The brake drum is rotatably coupled to the sleeve and a spigot on the end of the hub shell is adapted to enter a socket in the inner side of the brake drum.

A short sleeve or collar is slidably keyed on the spindle between the other end of the hub shell and the first side of the fork and a head or nut is provided on this end of the spindle so that the fork can be gripped between the collar and this head or nut. A plate slidably keyed on the collar has a cranked lug or arm which can be engaged with an abutment on the adjacent end of the hub shell but is normally held out of engagement by a spring which urges the plate against the fork.

To detach the wheel the angularly movable disc is first operated to slacken the studs holding the wheel to the brake-drum. The plate is then urged inwardly against the action of the spring and engaged with the abutment on the end of the hub shell. The wheel is thus keyed through the plate and collar to the spindle

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and by rotating the wheel the spindle is unscrewed out of the sleeve which carries the brake. This at the same time slackens the gripping of the fork between the collar and the head on the end of the spindle so that on removing the studs the wheel and spindle drop out of the fork leaving the brake-drum and chain-wheel in position as they are carried by the sleeve which is not disturbed. To replace the wheel the operations are simply re-

versed and a wheel can thus be removed and another substituted in a minimum of time without the use of any tools and without disturbing the brake connections or removing the chain in the case of a chain-driven wheel.

Dated the 20th day of November, 1935.
BARKER, BRETTELL & DUNCAN,
Chartered Patent Agents,
75 & 77 Colmore Row,
Birmingham, 3.

PROVISIONAL SPECIFICATION

No. 15154 A.D. 1936.

A New or Improved Detachable Wheel for Motor Cycles and the like

We, NORTON MOTORS LIMITED, a British Company, and EDGAR MARTIN FRANKS, British Subject, both of the Company's Works, Bracebridge Street, Birmingham, 6, do hereby declare the nature of this invention to be as follows:—

This invention relates to improvements in detachable wheels for motor cycles and the like. Various forms of readily detachable wheels have been proposed to allow a wheel to be removed and changed in the event of tyre trouble, but all of these necessitate the use of a spanner or some equivalent tool and it usually takes a substantial amount of time to change a wheel.

The object of our invention is to provide an improved form of readily detachable wheel which can be removed and replaced without the use of any tools and in a minimum of time, the various parts being so arranged that there is no risk of the wheel being loosened accidentally.

According to our invention a wheel is adapted to be detachably secured to a brake drum or chain-wheel or to a combined brake-drum and chain-wheel by three or more studs which are parallel to the axis of the wheel and are screwed into the drum or chain-wheel, and the studs after being tightened by the fingers are further tightened and locked by partial rotation of a disc having arcuate slots through which the studs pass. The parts of the disc adjacent to the slots are formed with inclined or cam surfaces so that as the disc is moved angularly these surfaces wedge between the heads of the studs and the surface of the wheel or of spacing sleeves through which the studs pass. The studs are thus simultaneously tightened and locked. Angular movement of the disc in the other direction releases the axial pressure on the studs which can then be unscrewed with the fingers. The disc is conveniently provided with one or more

radially projecting lugs for operating it, and there may be provided as a part of the frame of the machine or preferably on a sleeve slidably keyed on the spindle of the wheel an arm carrying a spring-pressed or other abutment which can be moved into the path of or into positive engagement with this lug so that the disc can be tightened or loosened by moving this abutment into position and rotating the wheel, and the spindle can also be unscrewed by rotating the wheel. The studs may be formed with shoulders which will only pass enlargements of the slots in the disc at one end so that the studs are normally anchored in and come away with the disc. If desired the disc may carry a spring-pressed detent engaging with serrations or recesses on the wheel hub to prevent accidental movement of the disc but this is not essential.

In one preferred practical form of our invention as applied to a motor-cycle wheel fitting between forks the wheel is mounted on ball-bearings housed in the hub shell on a spindle which at one end is held in one side of the fork and at the other end is screwed into a sleeve which is rigidly held in the other side of the fork and which carries the stationary back-plate of the brake. The brake drum and chain-wheel are rotatably coupled to the sleeve and a spigot on the end of the hub shell is adapted to enter a socket in the inner side of the brake drum.

A short sleeve or collar is slidably keyed on the spindle between the other end of the hub shell and the first side of the fork and a head or nut is provided on this end of the spindle so that the fork can be gripped between the collar and this head or nut. An arm integral with and projecting radially from the sleeve has slidably mounted in its outer end a peg or stud which can be pressed inwardly to

engage in an aperture in a lug on the cam disc but is normally held out of engagement with the cam disc by a blade spring. The peg is preferably provided with a head of slightly larger diameter than the peg and the aperture in the lug on the cam disc is complementarily stepped so that after the peg has been engaged in the aperture it will not spring out so long as there is any load on it.

To detach the wheel, the wheel is turned until the peg on the sleeve can be engaged in the aperture in the cam disc. The disc is thus locked to the sleeve which is keyed on the spindle and a small angular movement of the wheel will move the disc angularly to slacken the studs holding the wheel to the drum.

Further rotation of the wheel rotates the spindle and unscrews the spindle out of the stationary sleeve carrying the brake back-plate. This at the same time

slackens the gripping of the fork between the sleeve and the head on the end of the spindle, so that on removing the studs, which are preferably provided with milled heads for operation by the fingers, the wheel and the spindle drop out of the fork leaving the brake-drum and chain-wheel in position as they are carried by the stationary sleeve which is not disturbed.

To replace the wheel the operations are simply reversed and a wheel can thus be removed and another substituted in a minimum of time without the use of any tools and without disturbing the brake connections or removing the chain in the case of a chain-driven wheel.

Dated the 28th day of May, 1936.
BARKER, BRETTELL & DUNCAN,
Chartered Patent Agents,
75 & 77 Colmore Row,
Birmingham, 3.

COMPLETE SPECIFICATION

A New or Improved Detachable Wheel for Motor Cycles and the like

We, NORTON MOTORS LIMITED, a British Company, and EDGAR MARTIN FRANKS, British Subject, both of the Company's Works, Bracebridge Street, Birmingham, 6, 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 detachable wheels for motor cycles and the like. Various forms of readily detachable wheels have been proposed to allow a wheel to be removed and changed in the event of tyre trouble, but all of these necessitate the use of a spanner or some equivalent tool and it usually takes a substantial amount of time to change a wheel.

The object of our invention is to provide an improved form of readily detachable wheel which can be removed and replaced without the use of any tools and in a minimum of time, the various parts being so arranged that there is no risk of the wheel being loosened accidentally.

According to our invention a wheel is adapted to be detachably secured to a brake drum or chain-wheel or to a combined brake-drum and chain-wheel by three or more studs which are parallel to the axis of the wheel and are screwed into the drum or chain-wheel, and the studs after being tightened by the fingers are further tightened and locked by partial rotation of a disc having arcuate slots

through which the studs pass. The parts of the disc adjacent to the slots are formed with inclined or cam surfaces so that as the disc is moved angularly these surfaces wedge between the heads of the studs and the surface of the wheel or of spacing sleeves through which the studs pass. The studs are thus simultaneously tightened and locked. Angular movement of the disc in the other direction releases the axial pressure on the studs which can then be unscrewed with the fingers. The disc is conveniently provided with one or more radially projecting lugs for operating it, and there may be provided on a part of the frame of the machine or preferably on a sleeve slidably keyed on the spindle of the wheel an arm carrying a spring-pressed or other abutment which can be moved into the path of or into positive engagement with this lug so that the disc can be tightened or loosened by moving this abutment into position and rotating the wheel, and the spindle can also be unscrewed by rotating the wheel. The studs may be formed with shoulders which will only pass enlargements of the slots in the disc at one end so that the studs are normally anchored in and come away with the disc. If desired the disc may carry a spring-pressed detent engaging with serrations or recesses on the wheel hub to prevent accidental movement of the disc, but this is not essential.

One practical form of our invention as

applied to a motor-cycle wheel fitting between forks has been illustrated by way of example in the accompanying drawings in which:—

5 Figure 1 is a longitudinal section of the wheel hub and associated parts, the section being taken in a plane containing the axis of the spindle.

10 Figure 2 is an end elevation of the wheel hub assembly.

Figure 3 is a fragmentary plan of one end of the wheel assembly.

15 Figure 4 is a section similar to Figure 1 but showing the parts separated as in removing the wheel.

For convenience in the drawings only the hub shell 1 of the wheel has been shown. The wheel is rotatably mounted on ball bearings 2 housed in recesses in the ends of the hub shell on an axial sleeve 3 through which passes the spindle 4. One end of the spindle is formed with a hexagon head 5 which engages one side 6 of the fork on the cycle frame, and the other end of the spindle is screw-threaded and is detachably screwed into an axial bore in a sleeve 7 which is rigidly held in the other side 8 of the fork by a nut 9 screwed onto a spigot on the outer end of the sleeve. The sleeve 7 carries the stationary back-plate 10 of the brake which is clamped by the nut 9 between a shoulder 11 on the sleeve and a spacing washer 12 located on the sleeve between the inner face of the fork 8 and the back-plate. The brake-drum 13 which carries the chain-wheel 14 is rotatably coupled to the sleeve 7 by means of co-operating annular shoulders 15, 16 on the drum and sleeve, and a cylindrical spigot 17 on the end of the hub shell is adapted to enter a socket 18 on the inner face of the drum.

20 A short sleeve or collar 19 is slidably keyed on the spindle 4 between the other end of the hub shell and the side 6 of the fork which is adapted to be clamped between this collar and the hexagon head 5 on the spindle.

25 A disc 20 rotatably mounted on this end of the hub shell has three angularly spaced arcuate slots 21, and three studs 22 having milled heads pass through these slots and through spacing sleeve 23 parallel to the spindle and are screwed into bosses 24 on the brake-drum. One end of each sleeve is tapered and engages in a socket in the flange 25 of the hub shell remote from the disc 20 while the other end of the sleeve extends through the other flange 26 of the hub shell and engages the inner face of the disc 20. The flange 25 abuts against the brake-drum into which the studs are screwed, and the flanges 25 and 26 are thus relieved of the thrust applied by the studs which is taken wholly by the sleeves

23. This inner face of the disc 20 adjacent to each of the slots 21 is formed with an inclined or cam surface 27 so that the effective thickness of the disc increases towards one end of each slot. Thus if the studs 22 are tightened with the fingers when the disc is in such an angular position that the studs lie in the ends of the slots where the disc is of least thickness angular movement of the disc forces the cam surfaces between the ends of the spacing sleeves and the heads of the studs which are simultaneously tightened and locked.

30 Preferably the studs 22 are formed with reduced necks 28 which engage in the slots 21 and the main parts of the studs will only pass enlargements 29 at one end of each slot so that the studs are normally anchored in the disc.

35 The disc 20 may be provided with one or more radially projecting lugs to allow it to be moved angularly by hand or with a hammer or the like but preferably means are provided to allow it to be operated by rotation of the wheel. For this purpose a radially projecting arm 30 is provided on the collar 19 which is keyed on the spindle 4, and a spring-pressed peg 31 mounted in the outer end of the arm can be pressed inwardly by the fingers to engage in a recess 32 in a lug 33 on the disc. The peg is provided with a head of larger diameter than the peg and the recess in the lug is complementarily stepped as shown in Figure 1 so that after the peg has been engaged in the recess it will not spring out so long as there is any load on it.

40 To detach the wheel, the wheel is turned until the peg 31 can be engaged in the recess 32 in the cam disc 20. The disc is thus locked to the sleeve which is keyed on the spindle 4, and a small angular movement of the wheel relative to the disc slackens the studs 22 holding the wheel to the drum. Further rotation of the wheel rotates the spindle 4 and unscrews the spindle out of the stationary sleeve 7 carrying the brake back-plate. This at the same time slackens the gripping of the fork side 6 between the collar 19 and the head 5 on the spindle so that on removing the studs 22, which can be done with the fingers, the wheel and spindle drop out of the fork leaving the brake-drum and chain-wheel in position as they are carried by the stationary sleeve 7 which is not disturbed.

45 To replace the wheel the operations are simply reversed, and a wheel can thus be removed and another substituted in a minimum of time and without disturbing the brake connections or removing the chain in the case of a chain-driven wheel.

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 detachable wheel for motor cycles and the like in which a wheel is adapted to be detachably secured to a brake-drum or chain-wheel or to a combined brake-drum and chain-wheel by studs which are parallel to the axis of the wheel and are screwed into the drum or chain-wheel, and the studs after being tightened by the fingers are further tightened and locked by partial rotation of a disc having arcuate slots through which the studs pass and having adjacent to the slots inclined or cam surfaces which, on angular movement of the disc, wedge between the heads of the studs and the hub shell on the ends of spacing sleeves through which the studs pass.

2. A detachable wheel as claimed in Claim 1 in which means are provided for temporarily keying the disc to a stationary spindle passing through the wheel so that partial rotation of the wheel causes relative angular movement of the disc to lock or unlock the studs.

3. A detachable wheel as claimed in Claim 1 in which the wheel is rotatably mounted on ball bearings on a sleeve through which a stationary spindle extends, and one end of the spindle is detachably screwed into a stationary sleeve which is clamped in one side of a frame fork and this sleeve carries the stationary back-plate of the brake and has the brake-drum and chain-wheel rotatably coupled

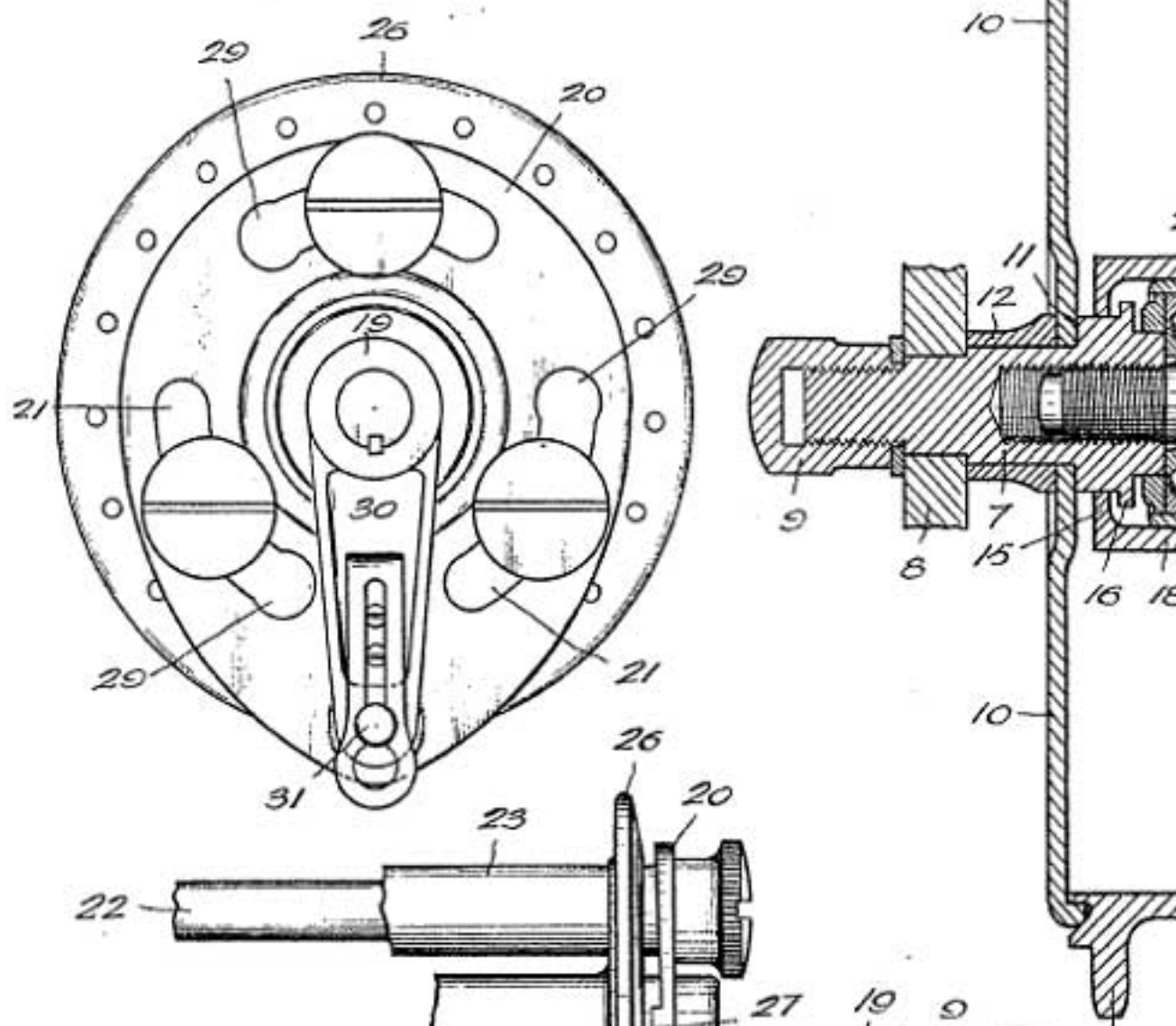
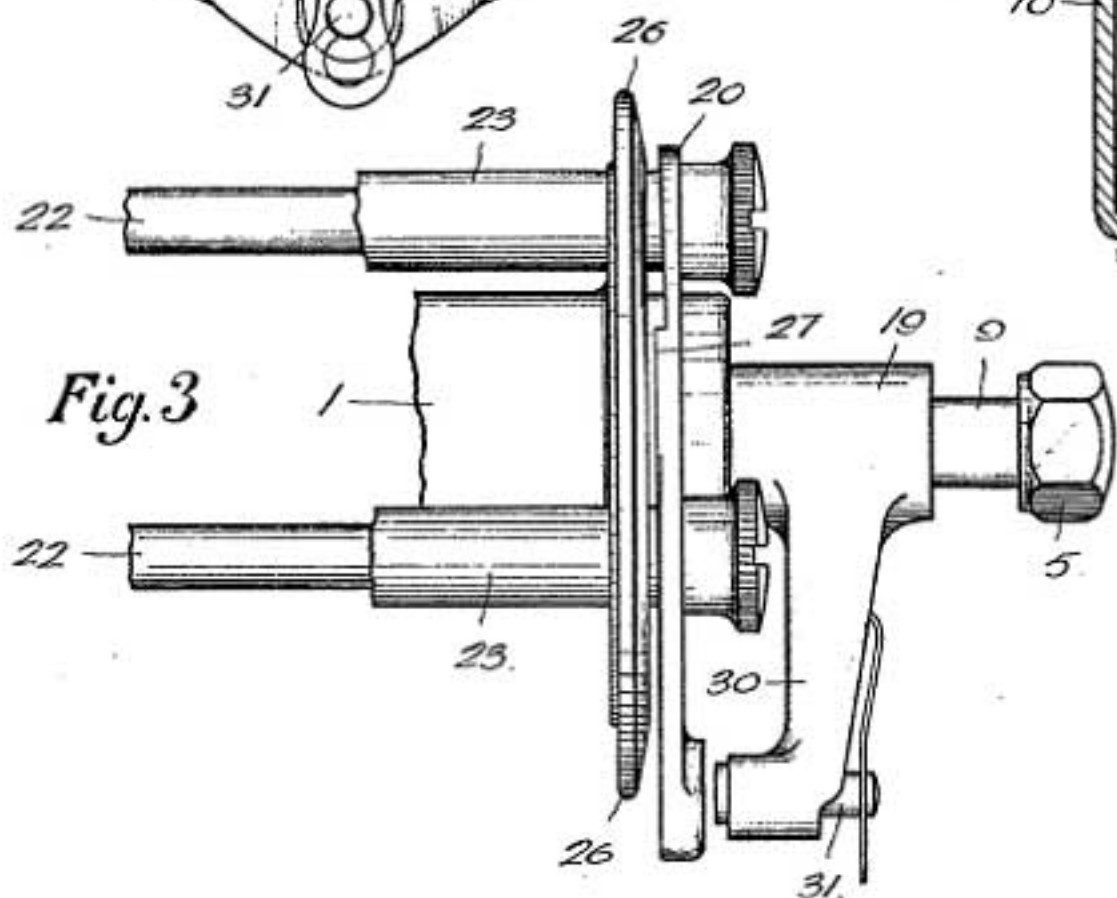
to it so that these parts are undisturbed when the wheel is removed.

4. A detachable wheel as claimed in Claim 1 in which a collar is slidably keyed on a stationary spindle for the wheel between the end of the hub shell remote from the brake-drum or chain-wheel and one side of a frame fork, and a radial arm on the collar carries a spring-pressed peg which can be engaged with a recess on the cam disc to couple the cam disc to the spindle so that angular movement of the wheel in one direction will cause relative angular movement of the cam disc to unlock the studs and further angular movement of the wheel will unscrew the spindle from a stationary sleeve into which it is screwed and which is secured in the other side of the fork and carries the brake-drum and chain-wheel.

5. A detachable wheel as claimed in Claim 1 in which the studs pass through spacing sleeves each of which seats at one end in a recess in the flange of the hub shell remote from the cam disc, and the other end of the sleeve extends through the other flange of the hubshell into engagement with the inner face of the cam disc.

6. The detachable wheel for motor cycles and the like substantially as described with reference to the accompanying drawings.

Dated the 18th day of November, 1936.
BARKER, BRETTELL & DUNCAN,
Chartered Patent Agents,
75 & 77 Colmore Row,
Birmingham, 3.

Fig. 2*Fig. 3*

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

Fig. 1

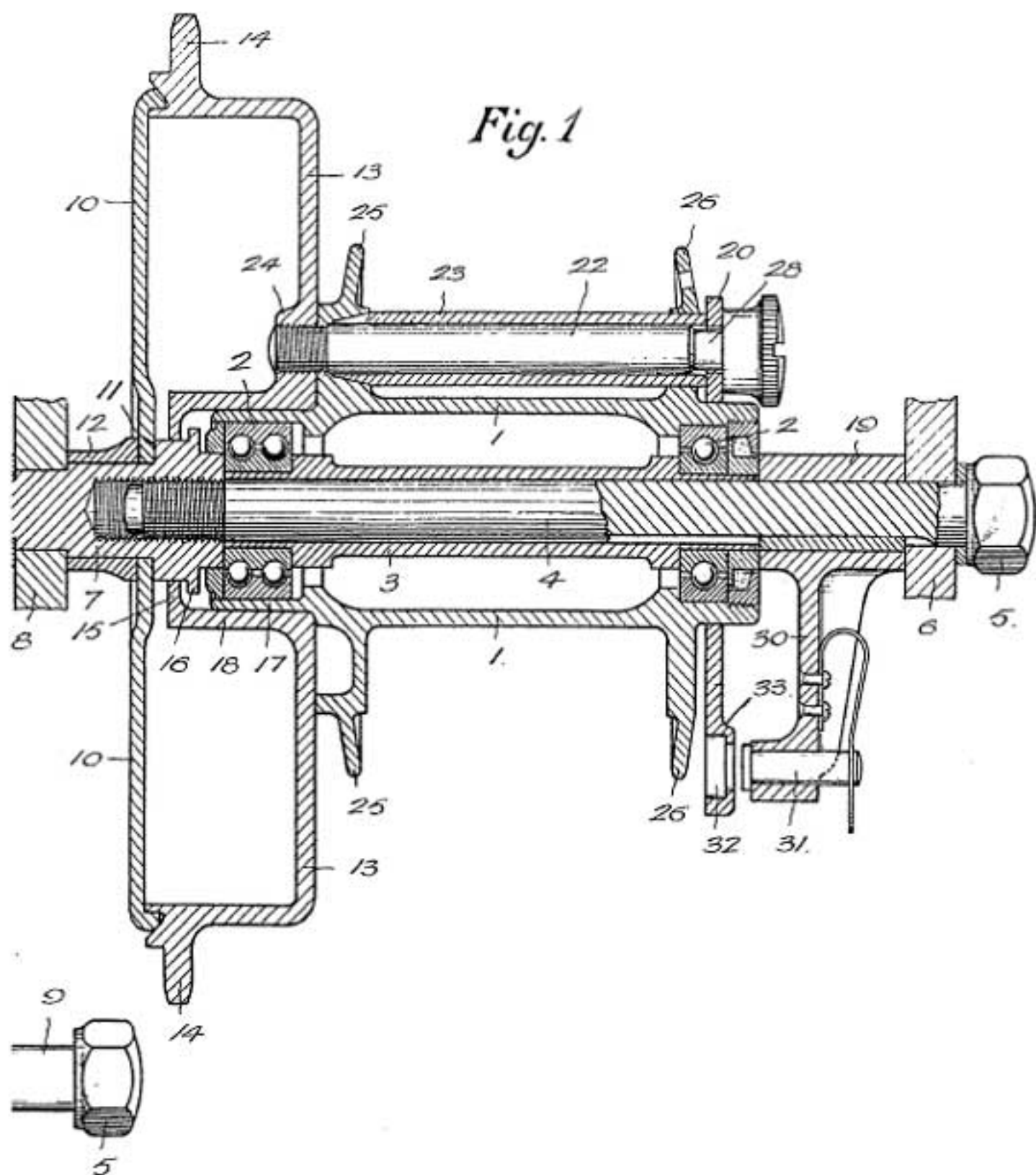


Fig. 2

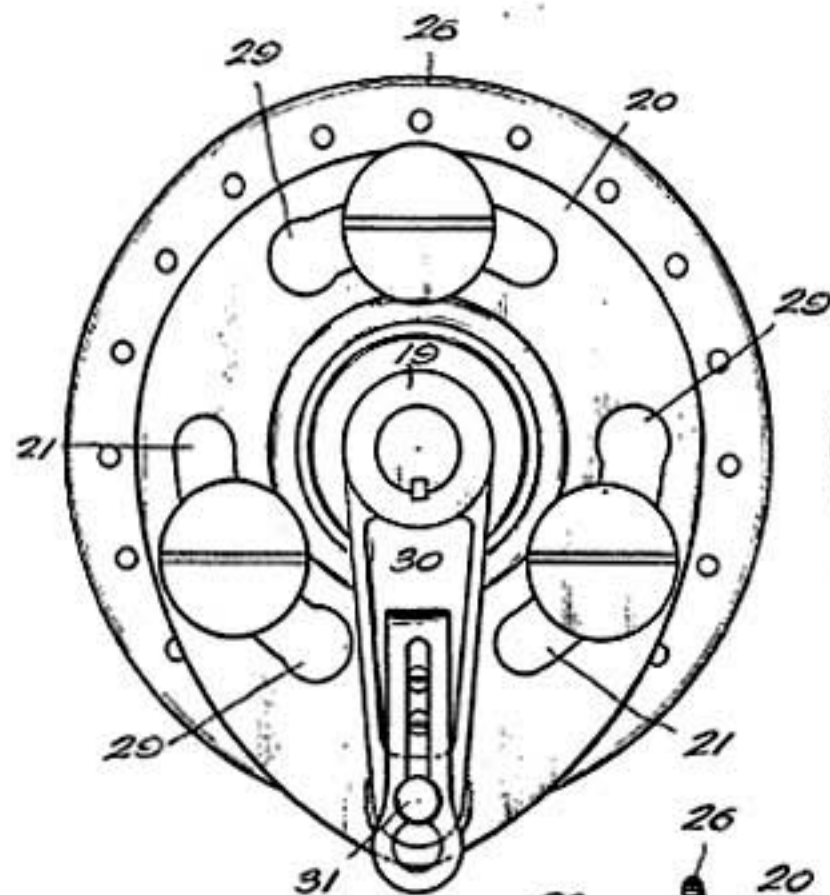


Fig. 1

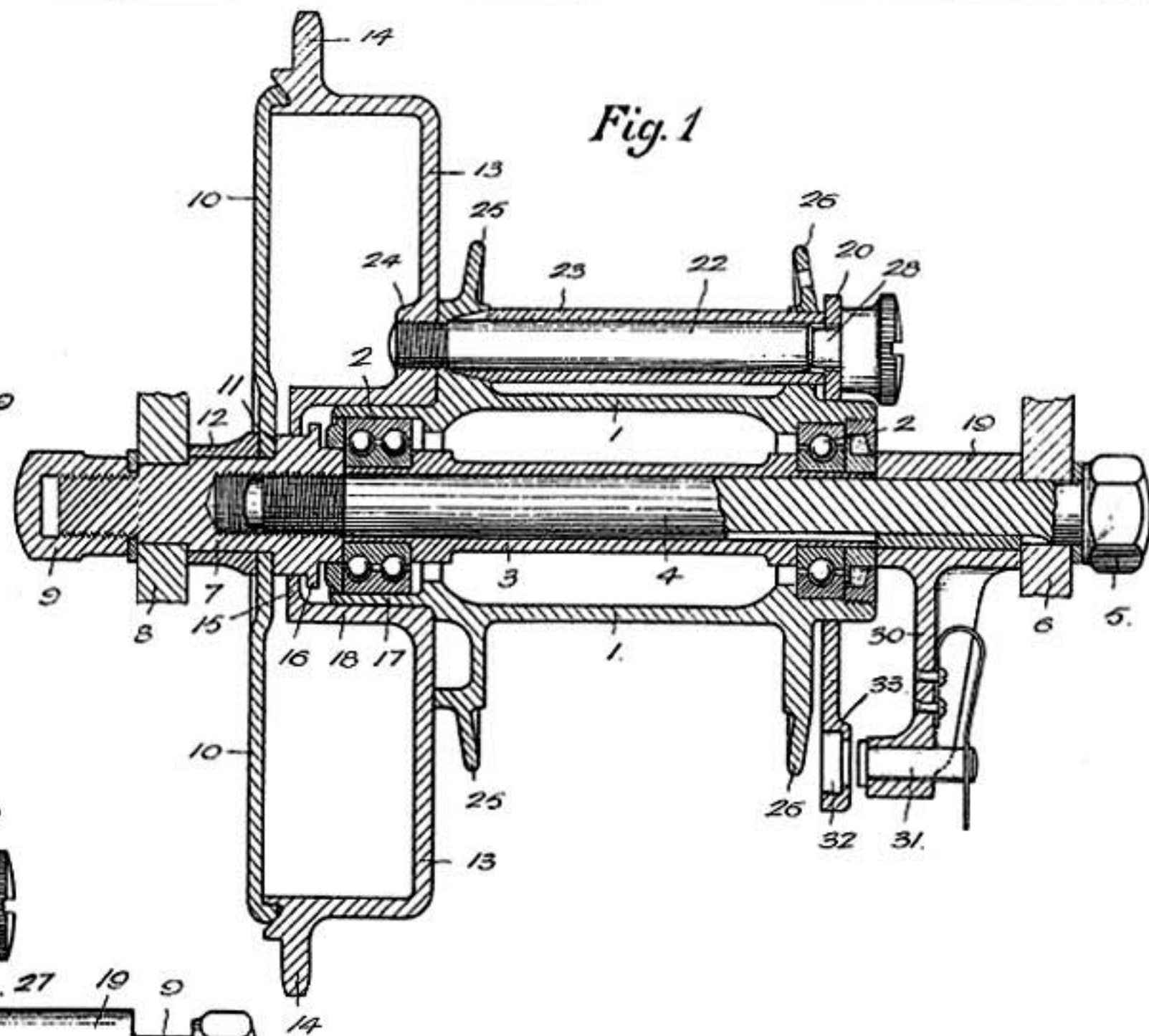
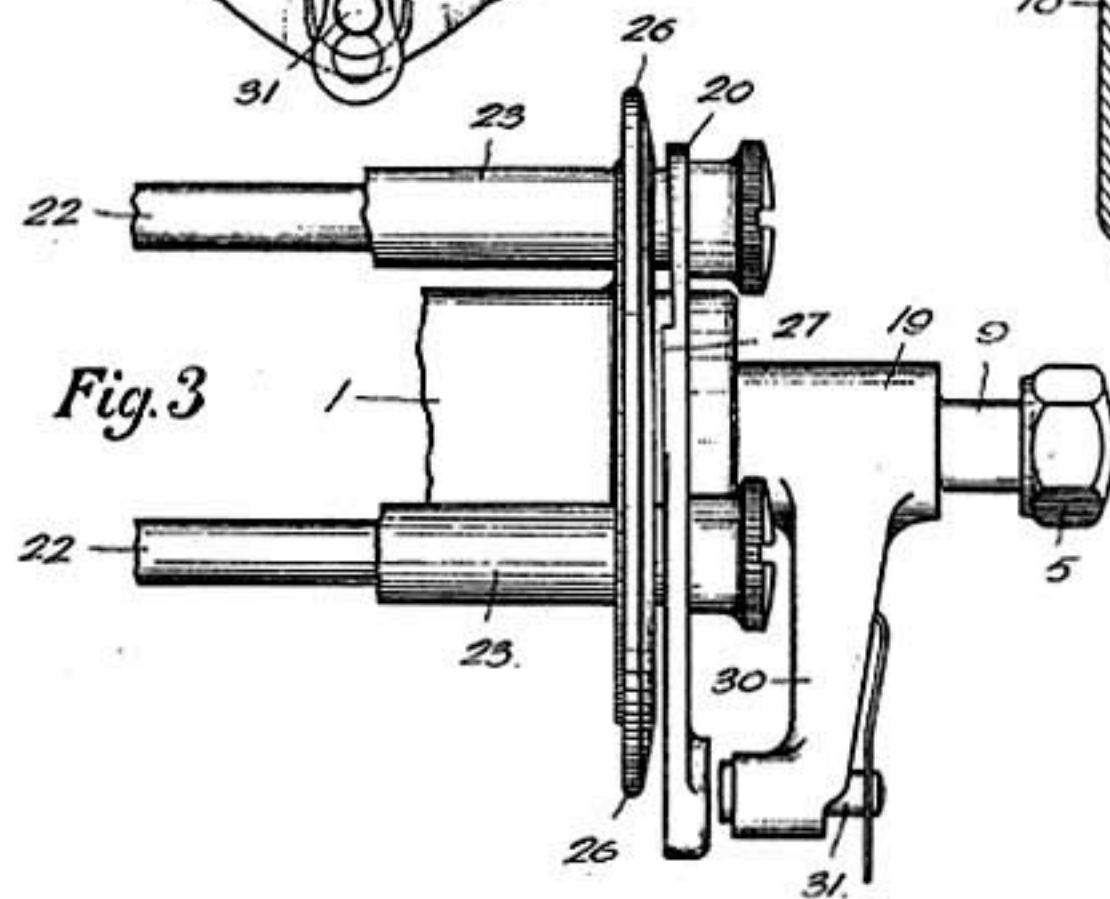


Fig. 3



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

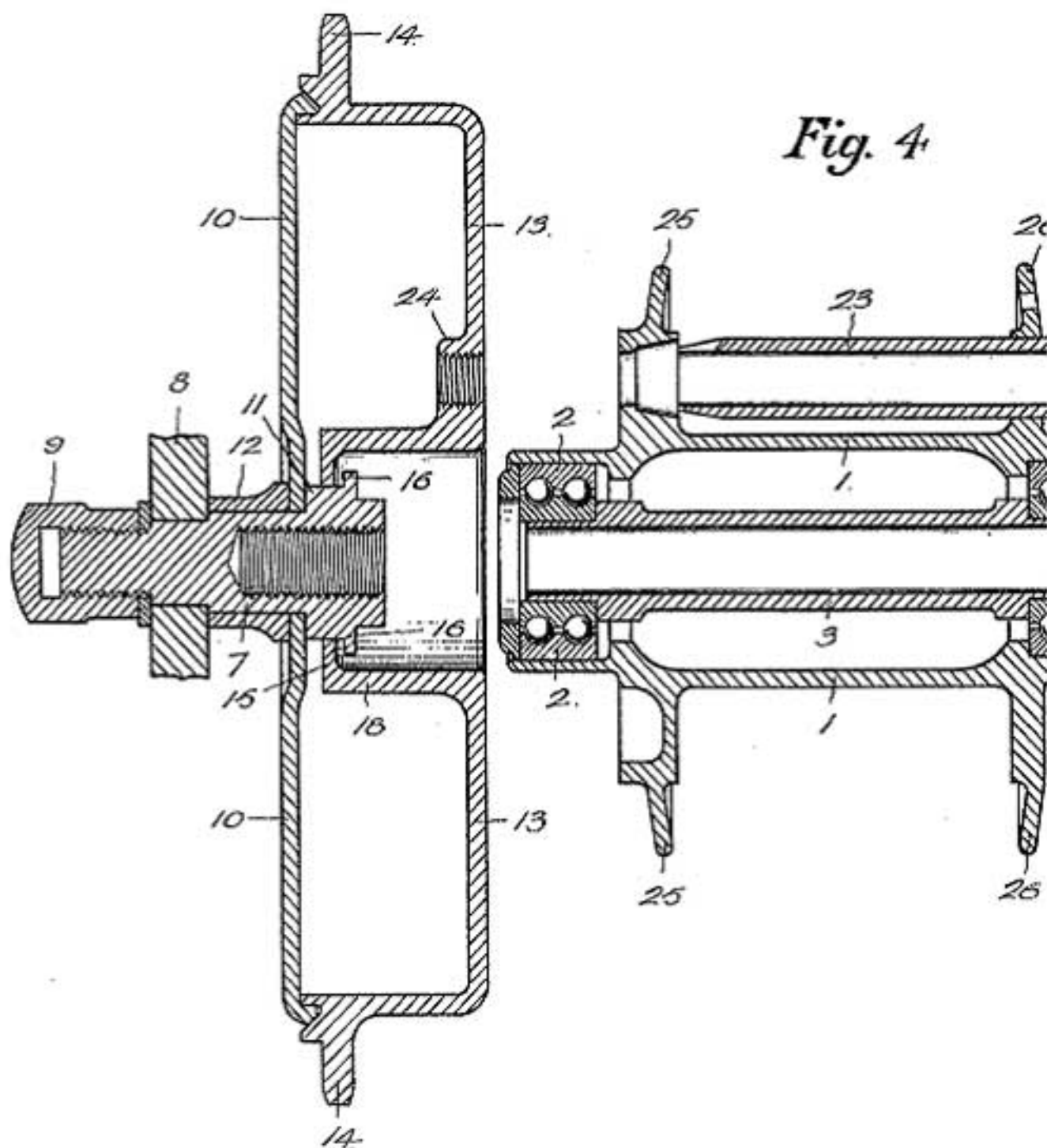


Fig. 4

Fig. 4

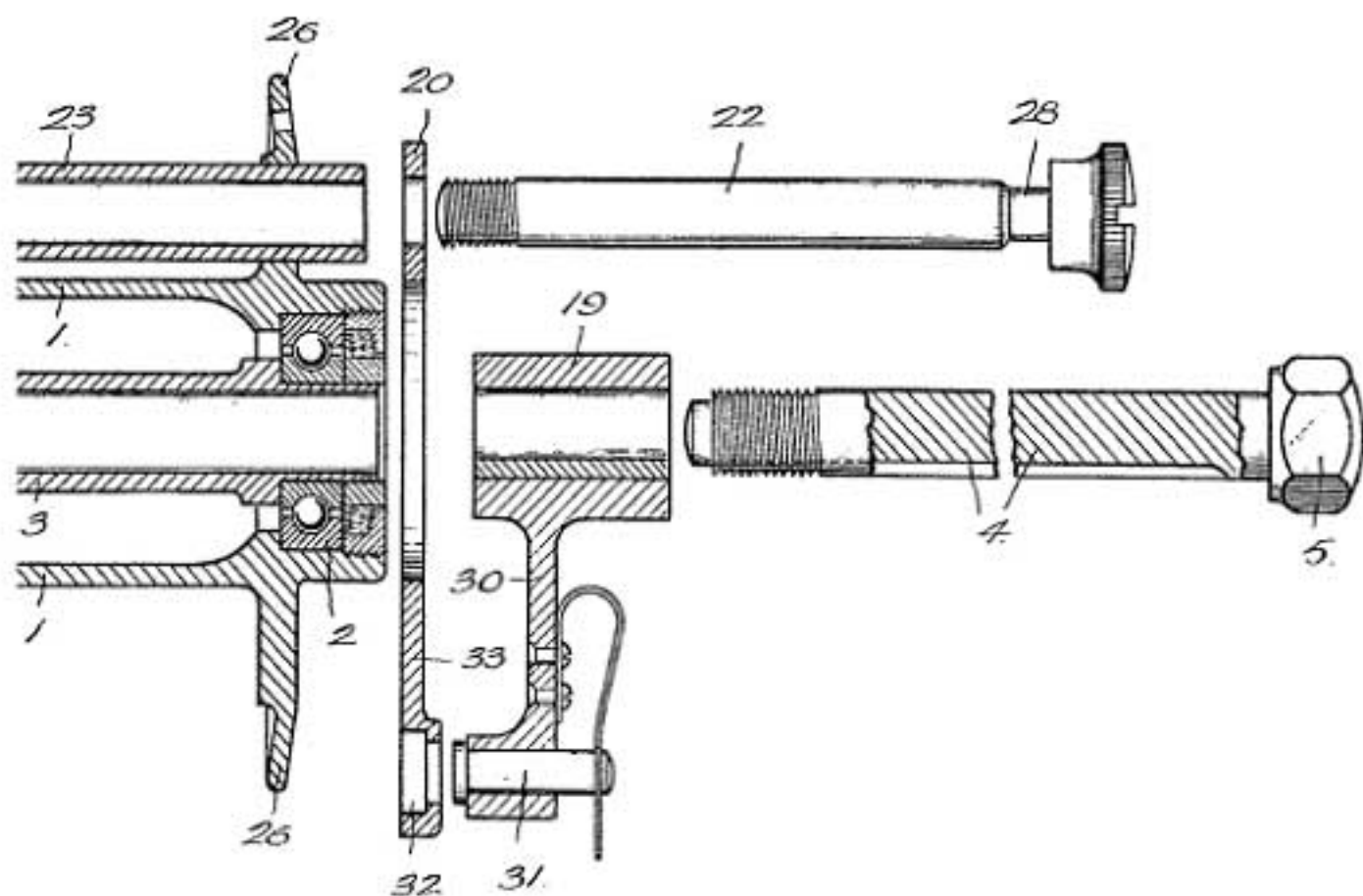
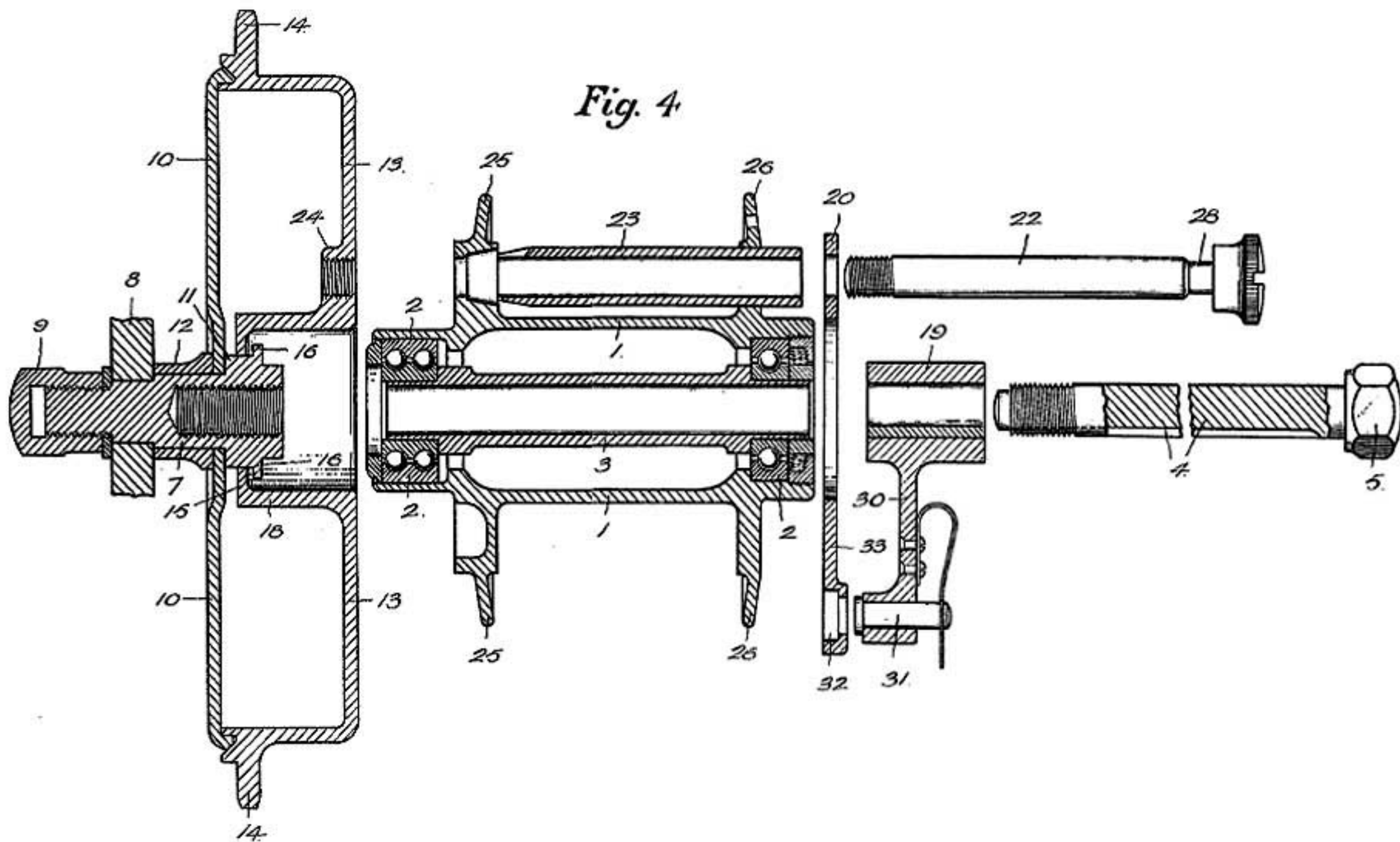


Fig. 4.



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