No. 741,659. PATENTED OCT. 20, 1903.

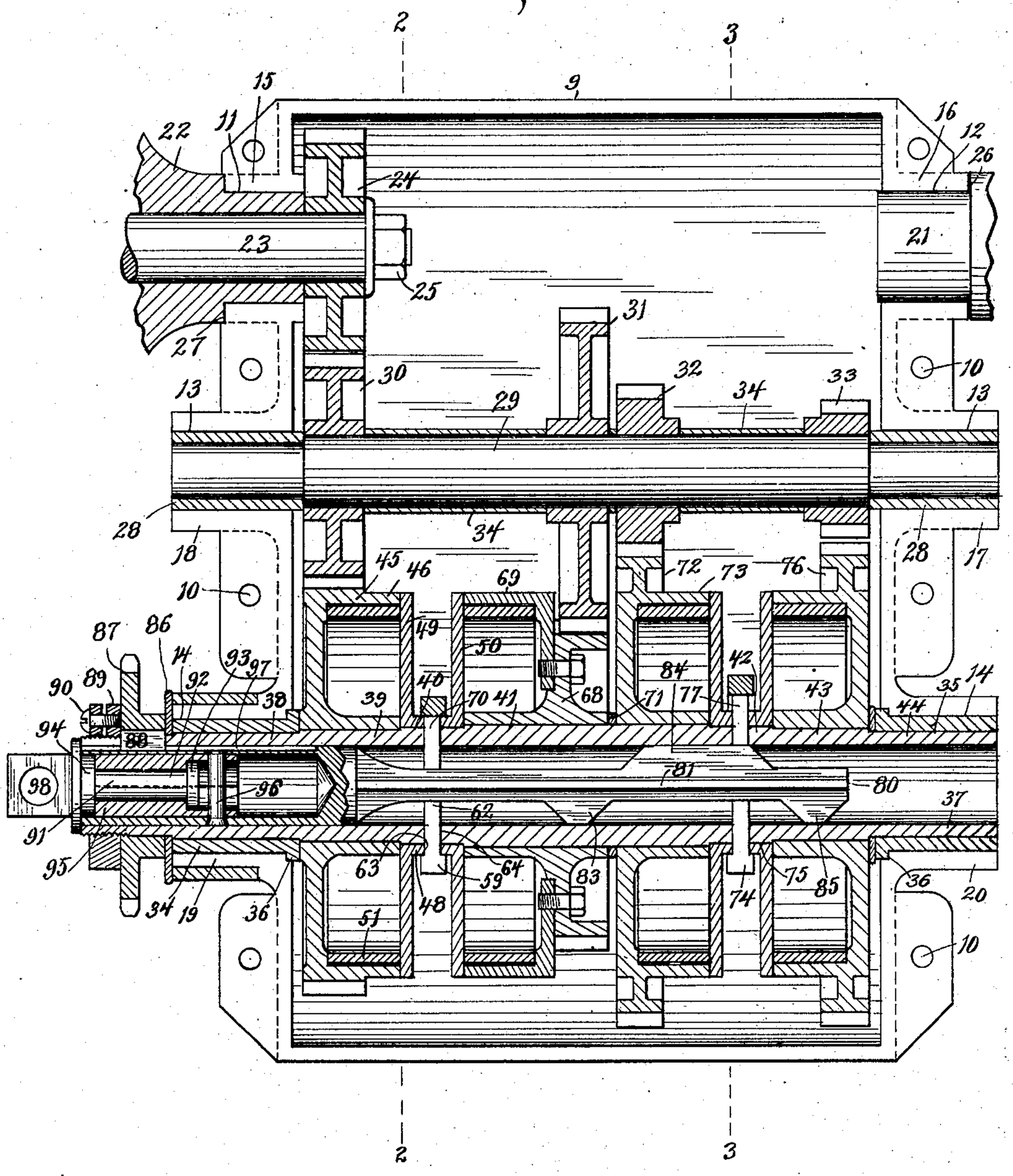
C. L. HAASE, JR.

GEARING.

APPLICATION FILED MAY 23, 1902

NO MODEL. 3 SHEETS—SHEET 1.

Fig. 1.



Witnesses.

C. N. Keeney

Anna C. Faust.

Inventor.

Charles L. Haase Jr.

by Benedict, Morsell and Brau.

Attorneys.

No. 741,659. PATENTED OCT. 20, 1903.

C. L. HAASE, Jr.

GEARING.

APPLICATION FILED MAY 23, 1902.

NO MODEL. 3 SHEETS—SHEET 2.

Fig. 2.

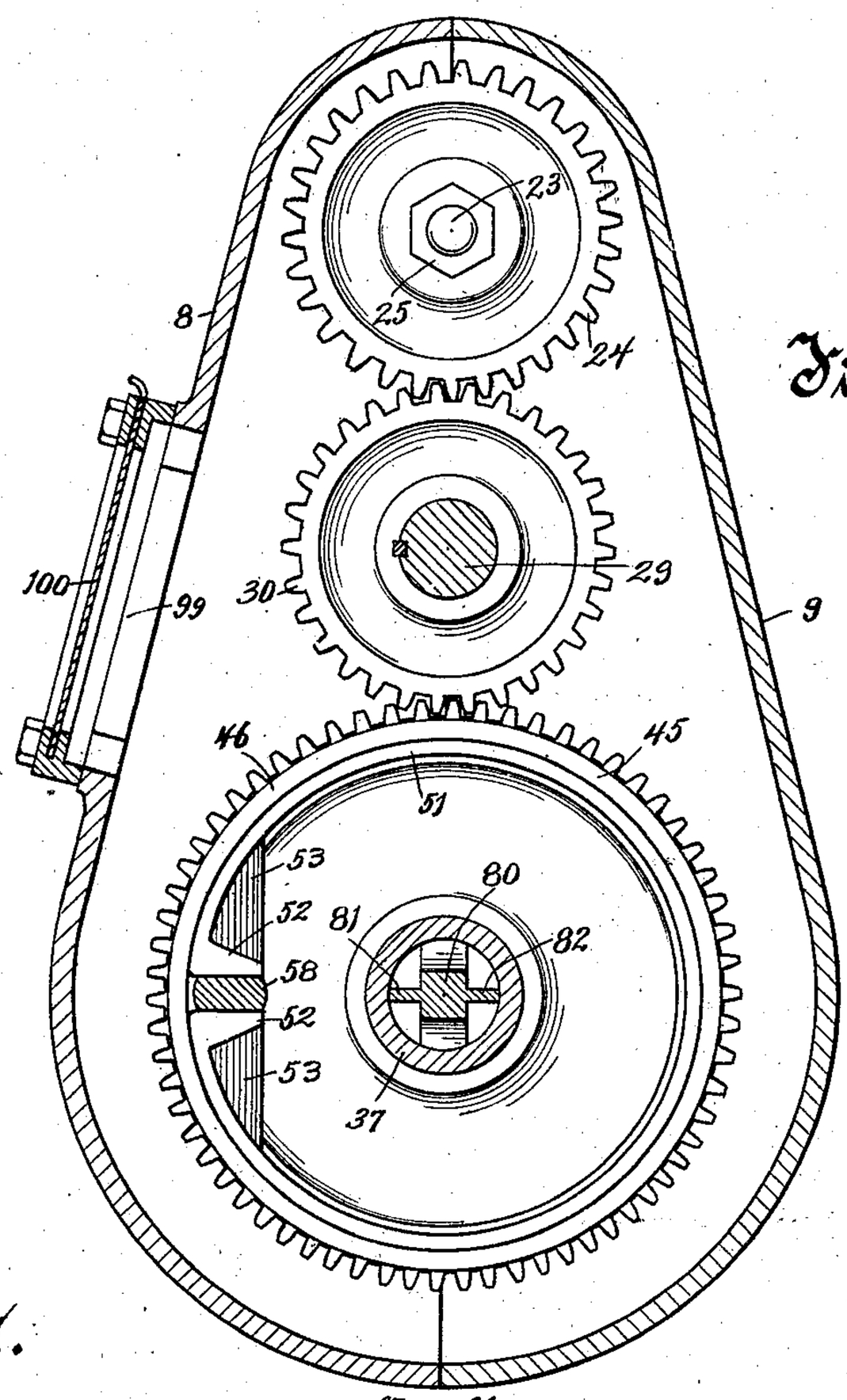


Fig. 7.

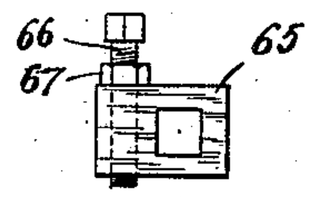


Fig. 5.

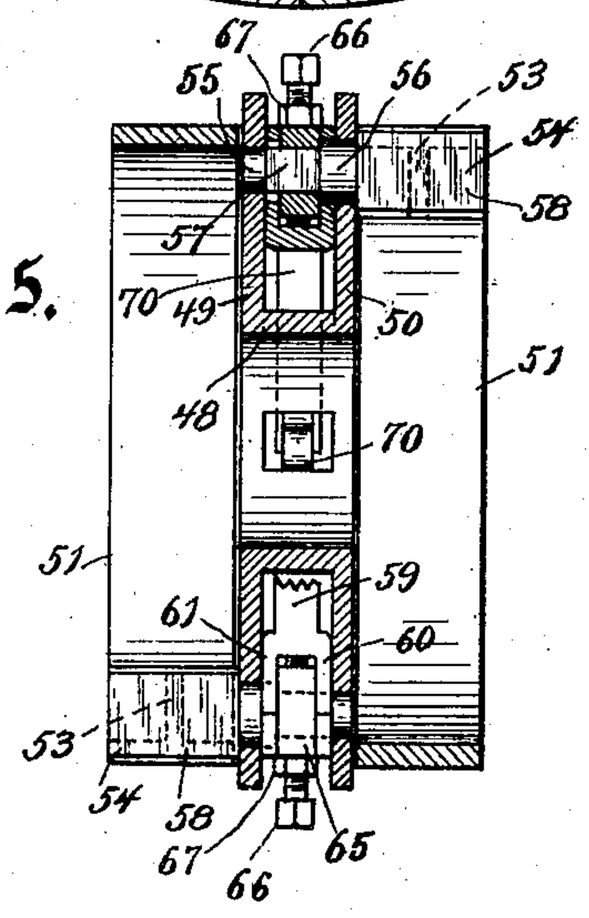
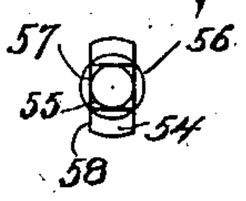


Fig. 6.



Witnesses.

C. H. Keeney.

Anna V. Faust.

Inventor.

Charles L. Haase Jr.

by Benedict, Morsell and Brew

Attorneys.

No. 741,659. PATENTED OCT. 20, 1903.

C. L. HAASE, JR.

GEARING.

APPLICATION FILED MAY 23, 1902.

NO MODEL. 3 SHEETS—SHEET 3.

Fig. 3.

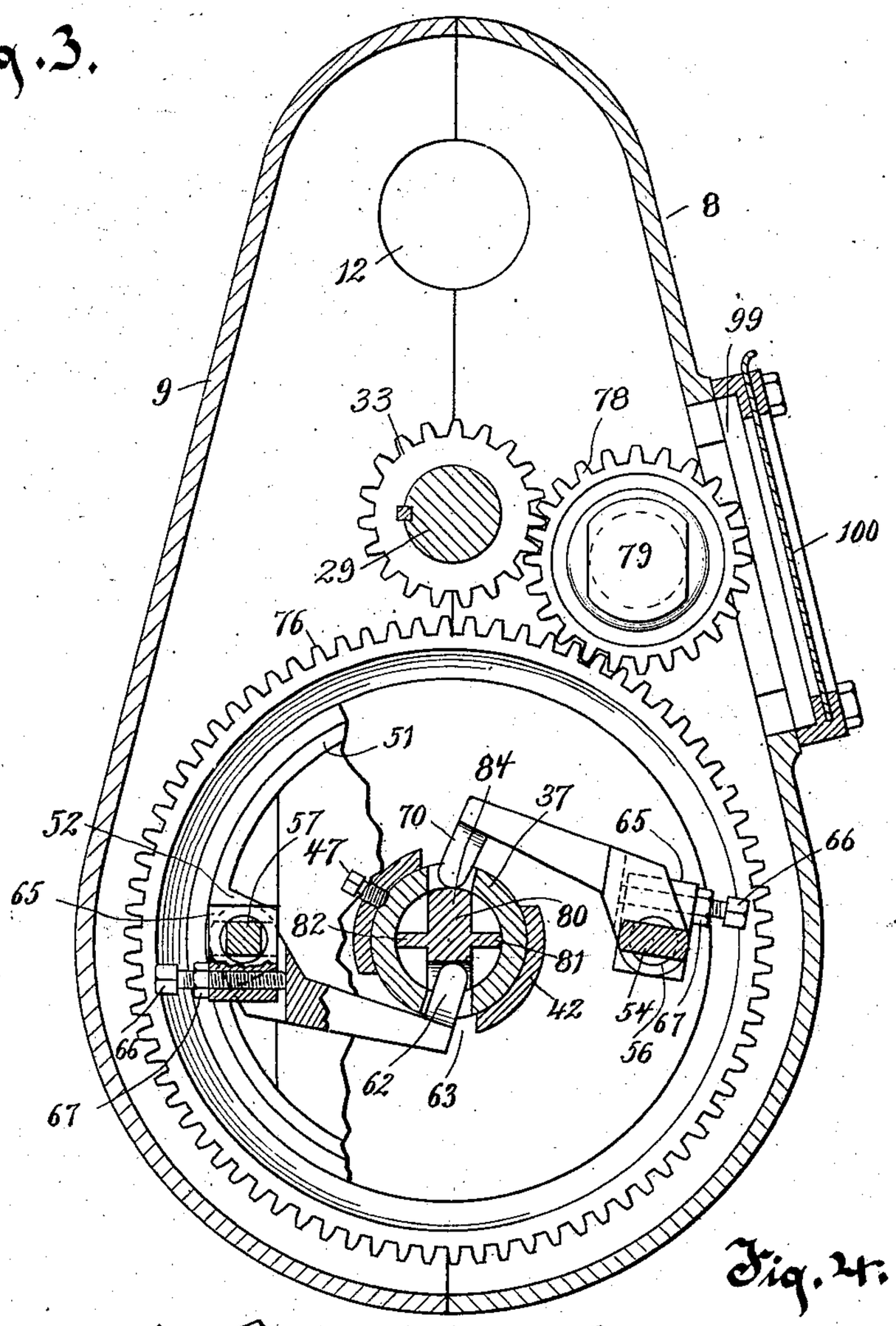
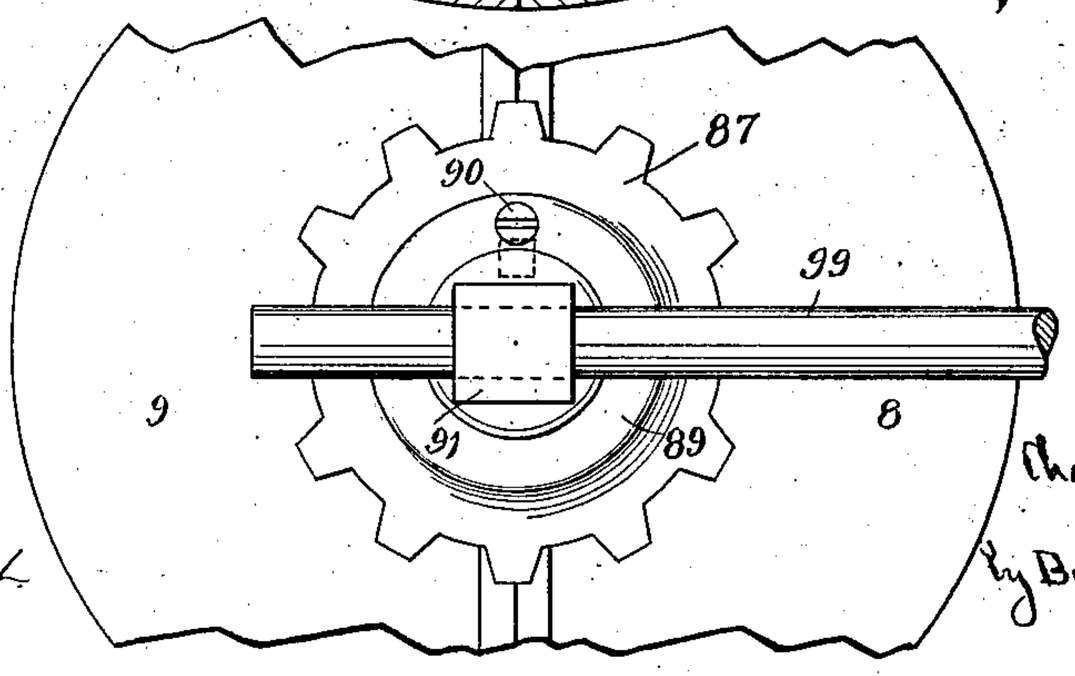


Fig. 4.



Witnesses:

A. F. Keeney

Arnold C. Faust.

Inventor.

Charles L. Haase Jr.

by Brudick, Worrill and Grün

Attorneys.

No. 741,659. Patented October 20, 1903.

UNITED STATES PATENT OFFICE.

CHARLES L. HAASE, JR., OF MILWAUKEE, WISCONSIN, ASSIGNOR TO NORTHWESTERN FURNITURE COMPANY, OF MILWAUKEE, WISCONSIN, A COPARTNERSHIP COMPOSED OF CHARLES L. HAASE, RUDOLPH C. HAASE, AND RUDOLPH C. FORRER.

GEARING.

SPECIFICATION forming part of Letters Patent No. 741,659, dated October 20, 1903.

Application filed May 23, 1902. Serial No. 108,623. (No model.)

To all whom it may concern:

Be it known that I, CHARLES L. HAASE, Jr., residing at Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented a new and useful Improvement in Gearing, of which the following is a description, reference being had to the accompanying drawings, which are a part of this specification.

This invention relates to gearing, and the object of the invention is to produce improvements in devices by means of which the movement transmitted from a motor or engine to the member or part to be driven may be varied or changed in speed or reversed in direction as is desired. This and other objects I attain in a device embodying the elements in its make-up constructed and arranged as described in the specification and illustrated in the accompanying drawings, in which—

Figure 1 is a longitudinal sectional view of a device embodying this invention. Fig. 2 is a cross-sectional view of the same, taken on line 2 2 in Fig. 1. Fig. 3 is a cross-sectional view taken on line 3 3 in Fig. 1. Fig. 4 is an end elevation of a portion of the device. Fig. 5 is a sectional view of a portion of the clutch mechanism. Figs. 6 and 7 are detail views of portions of the clutch mechanism.

Throughout the several views like elements are denoted by like characters.

The device employs transmitting gear-wheels, the complementary members of which are always in mesh one with the other, and the device comprises a driving gear-wheel adapted to be operatively connected to the engine or motor from which power is to be derived, a driven shaft carrying a sprocket-wheel or other member comprising a portion of the transmitting mechanism between said shaft and the device intended to be driven, loosely-mounted gear-wheels carried on the driven shaft, clutch mechanism positively carried by the driven shaft for each of said loosely-mounted gear-wheels, a shaft intermediate of said loosely-mounted gear-wheels and the driving gear-wheel, carrying a gear-wheel always in mesh with the driving gear-wheel and one of said loosely-mounted gear-wheels and a gear-wheel for each of said loosely-mounted gear-wheels and always in mesh therewith, and a slidable or longitudinally-movable lever-actuating member carried within the driven shaft and provided with means which will, as said member is moved longitudinally in one direction or the other, cause the clutch mechanism for said loosely-mounted gear-wheels to be alternately forced into operative position for alternately locking the gear-wheels to the driven shaft to thereby cause said shaft to be rotated by the gear-wheel so locked to it.

The device, as illustrated in the accompanying drawings, is especially designed for use on motor-propelled vehicles, such as automobiles, and more particularly to automobiles propelled by internal-combustion or so-called "explosive" engines, not capable of being readily started under load.

With the device as a portion of the power-transmitting mechanism between the motor and the driving-wheels of the vehicle the engine or motor may be started without load and run until its desired speed is attained. Then by moving the actuating-lever for the device to one of its predetermined positions the desired power will be transmitted to the sprocket-wheel and through the remaining transmitting mechanism to the driving-wheels of the vehicle.

The device is adapted to be self-contained and the mechanism in its make-up supported within a dust-proof oil-containing casing formed in two sections 8 and 9, which have their abutting faces machined, so that a close fit may be obtained. The sections are bolted together by means of bolts which pass through holes 10 in section 8 and registering bolt-holes in section 9, and when the sections are so bolted together holes 11, 12, 13 13, and 14 14 will be drilled or bored through lugs 15, 16, 17, 18, 19, and 20, formed therefor in the casing. The holes 11 and 12 will register, so also will the holes 13 13 and the holes 14 14, and half of each of said holes will lie within each section 8 and 9. The casing is pivotally supported on the vehicle, on one side by

stud-pin 21, carried by any convenient portion of the vehicle, and on the other side by a stud 22, carried by a portion of the vehicle, or on the engine frame or bed. The stud-pin 22 is bored out to receive and carry a projection 23 of the engine-shaft, to the end of which is keyed a driving gear wheel or member 24, held onto said shaft by means of a suitable washer and a nut 25, threaded to said shaft. The casing is prevented from side movement by means of contacting with a shoulder 26, formed on stud-pin 21, and a shoulder 27, formed on stud 22. Each of the holes 13 is lined with a suitable antifriction sleeve or lining 28, formed of phosphor-bronze, Babbitt, or other suitable metal, and within these sleeves is journaled a rotatable shaft 29, to which at suitable positions are keyed gear-wheels 30, 31, 32, and 33, prevented from moving longitudinally of said shaft by means of sleeves or spacers 34, carried therebetween on the shaft. The holes 14 are lined with sleeves or bushings 35, similar to 28, but formed with flanges 36, adapted to lie within counterbores in the inner ends of holes 14, and a hollow shaft 37, designated as the "driven" shaft, is journaled within the sleeves. The outer surface of shaft 37 is formed in the nature of concentric steps 38, 39, 40, 41, 42, 43, and 44. The risers of steps 38 and 44 contact with the inner ends of sleeves 34 and 35, respectively, and prevent longitudinal movement of shaft 37. Step 39 loosely carries a gear-wheel 45, which surrounds the shaft and meshes with gear-wheel 30. Gear-wheel 45 is provided with a laterally-projecting annular flange 46, forming a friction-drum. Rigidly carried by shaft 37 on step 40 and secured thereto by means of a set-screw 47, Fig. 3, is a collar 48, provided with two disk-shaped projecting faces 49 and 50.

An annular split friction-ring 51 is carried within the drum or flange 46 and is adapted when spread or expanded to contact with and grip the inner friction-surface of said drum. The ring 51 at its point of separation is provided with two radially-extending flanges 52, each braced to the ring by means of a web 53. The separated points of the ring or the flanges 52 when the ring is loose within the drum are adapted to stand a distance apart as shown in Fig. 2.

A rockable expander 54 for the expansible friction-ring 51, having concentric cylindrical bearing portions 55 and 56 of different diameters, a squared portion 57, connecting said bearing portions, and a flattened expander portion 58, adapted to lie between flanges 53 of said expansible ring, is journaled within holes therefor in disks 49 and 50.

An actuating-lever 59 for the clutch mechanism is formed with a bifurcated end, the furcate parts 60 and 61 of which are provided with concentric circular holes, the walls of which are adapted to loosely surround the expander 54. The lever 59 is carried by the larger cylindrical portion 56 of the expander and is provided with an angularly-projecting arm 62, adapted to project into the opening within driven shaft 37, through an opening 63 in collar 48, and an opening 64 in shaft 37 therefor.

A block 65, provided with a squared opening to fit the squared portion of the expander, is carried by the expander, and a set-screw 66, locked in adjusted position by a lock-nut 67, is threaded through an opening therefor in the block and bears against the lever 59 between the furcate parts thereof to limit the depth to which the projecting arm 62 of lever 59 will extend into the hollow driven shaft 37. The pressure of the expansible friction-ring 51, acting on the flattened portion 58 of the expander through the radially-extending flanges 52, will tend to keep the projecting arm 62 toward the limit of its inward movement in the driven shaft, and as the projecting arm 62 is by means moved outward the expander will be rocked and ring 51 expanded or enlarged, and if arm 62 is moved far enough ring 51 by friction will be locked to drum 46. It will be seen that if the expander-ring is locked to the drum and driving gear-wheel 24 is rotated the driven shaft 37 will also be rotated by means of gear-wheels 30 and 45.

Step 41 of driven shaft 37 loosely carries a gear-wheel 68 in mesh with gear-wheel 31. A drum 69, provided with an annular friction-face similar to the friction-face of drum 46, is bolted or otherwise secured to gear-wheel 68. An expander-ring similar to ring 51 is carried within drum 69 and is adapted to be actuated by means of a lever 70 and the related elements similar to those heretofore described.

Separated from gear-wheel 68 by means of a spacer 71, carried on the driven shaft and loosely mounted on step 41, is another gear-wheel 72 in mesh with gear-wheel 32. Gear-wheel 72 is provided with a drum 73 and clutch mechanism similar to that heretofore described, adapted to be actuated by means of a lever 74, similar to lever 59. The lever and clutch actuating mechanism is carried by a disked collar 75, secured to step 42 of shaft 37 and similar to collar 48.

Loosely mounted on step 43 of shaft 37 is a gear-wheel 76, adapted to be locked to shaft 37 through the medium of a clutch mechanism similar to that heretofore described, actuated by a lever 77.

A gear-wheel 78, Fig. 3, suitably journaled on a stud 79, carried by section 8 of the casing, meshes with gear-wheels 76 and 33, so that gear-wheel 76 will rotate in the same direction as gear-wheel 33 and in the opposite direction from driving gear-wheel 24.

As heretofore said, the driven shaft 37 is formed with a hollow bore, and within this bore a slidable actuating member 80 for the levers 59, 70, 74, and 77 is located. This

slidable member in cross-section is shaped as shown in Figs. 2 and 3, with guiding-flanges 81 and 82 adapted to bear against the walls of the bore in the shaft. The slidable member is also provided with three laterally-projecting portions 83, 84, and 85, having inclined ends. As the slidable member is moved longitudinally the lever-arms 59, 70, 74, and 77 are adapted alternately to ride up the inclined ends of the projections and rest on the tops thereof, which are curved concentrically to the bore in shaft 37. It will be seen that by moving shaft or slidable member 80 to its different positions different levers may be moved out of the bore in the shaft 37 and caused to actuate their respective clutch mechanisms to lock the gear-wheels complemental thereto to the driven shaft 37. The forward portion of the slidable member 80 is cylindrically formed, so as to snugly but movably fit the bore of the driven shaft.

The driven shaft extends beyond lug 19 and is cut down to receive a washer 86 and a sprocket-wheel 87, kept from turning on the shaft by means of a feather 88 entering a slot therefor in the sprocket-wheel and a registering slot therefor in the shaft. The sprocket-wheel is held against longitudinal movement on the shaft by means of a lock-nut 89, threaded over the outer end of the shaft and provided with a suitable locking means 90.

The cylindrical portion of the slidable member 80 is bored out to receive a connecting member 91, having a cylindrical center portion 92, an enlarged cylindrical shoulder 93 at its inner end, and a stepped shoulder 94 at its outer end, the smaller of said steps lying within the bore of the slidable member, while the larger of said steps serves to limit the movement of said slidable member into the driven shaft 37. The connecting member 91 is held within the slidable member 80 by means of a split sleeve 95, secured within the slidable member by means of a rivet-pin 96. The slidable member is provided with a slot or elongated recess 97, formed therein beneath feather 88, and into which said feather projects to lock the slidable member 80 to shaft 37. The outer end of the connecting member 91 is provided with a hole 98 extending therethrough, within which an actuating-rod 99 is adapted to slidably fit.

Section 8 of the casing is provided with a door or manhole 99 to permit access to the interior of the casing for adjusting the screws 66, and said door or manhole is adapted to be closed by means of a suitable plate 100.

Having thus described my invention, I claim—

1. The combination with a pivotally-mounted casing, of a driving member mounted in said casing, a driven member mounted therein and slidable means rotatable with said driven member for causing said driven member to be driven at different speeds while said driving member rotates at one speed.

2. The combination with a pivotally-mounted casing, of a driving member therein, a driven member therein, a series of transmitting means intermediate of said driving and said driven members, and slidable means revoluble with said driven member for causing said driven member to be operated at different speeds while said driving member rotates at one speed.

3. The combination with a pivotally-mounted casing, of a driving-gear member revolubly mounted in said casing, a revoluble shaft carrying a driven member, said driven member, gear members loosely mounted on said shaft, a power-transmitting gear member in mesh with each of the gear members on said shaft in operative connection with said driving member, clutch mechanism between said shaft and each of the gear members thereon, and a slidable member carried within and revoluble with said shaft and adapted as it is slid to throw one or the other of said clutch mechanisms into operation to lock its gear member to said shaft.

4. The combination with a pivotally-mounted casing, of a driving part journaled therein, a rotative shaft journaled in said casing, means for operating the latter by the driving part, a driven shaft, a series of rotative members loosely carried by the driven shaft, a clutch mechanism for each member of said series, means slidable within and revoluble with said shaft, there being an operating projection of said slidable member for each of said clutch mechanisms, an actuating-lever for each clutch mechanism normally lying in the path of one of said operating projections and a non-rotative member carried by said slidable member by means of which said slidable member may be moved to different positions to operate one or the other of said actuating-levers and thereby its clutch mechanism.

5. The combination with a casing, of means for pivotally mounting said casing, a driving-gear having its center common with the center of the pivotal means on which the casing is mounted, a driven shaft, a plurality of gears loosely mounted on said shaft, mechanism for locking one or the other of said gears to said shaft, and a shaft intermediate of said driven shaft and said driving-gear for transmitting motion from said gear having its center common with the pivotal means to the driven shaft.

In testimony whereof I affix my signature in presence of two witnesses.

CHARLES L. HAASE, JR.

Witnesses:
ANNA V. FAUST,
JNO. S. GREEN.