No. 765,498. PATENTED JULY 19, 1904.

W. L. MARR.

CHANGE SPEED GEAR.

APPLICATION FILED AUG. 3, 1903.

NO MODEL. 2 SHEETS—SHEET 1.

Fig. 1.

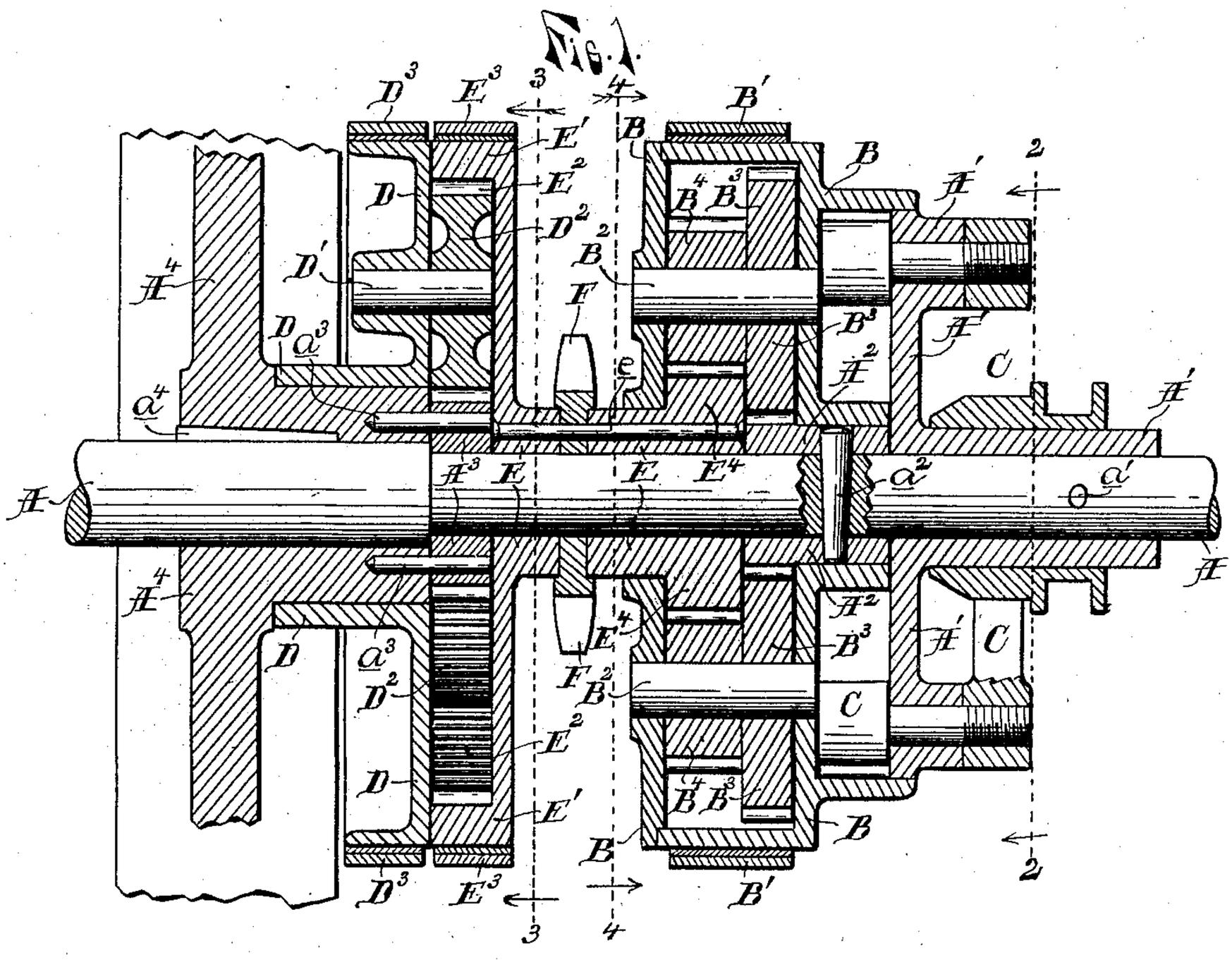
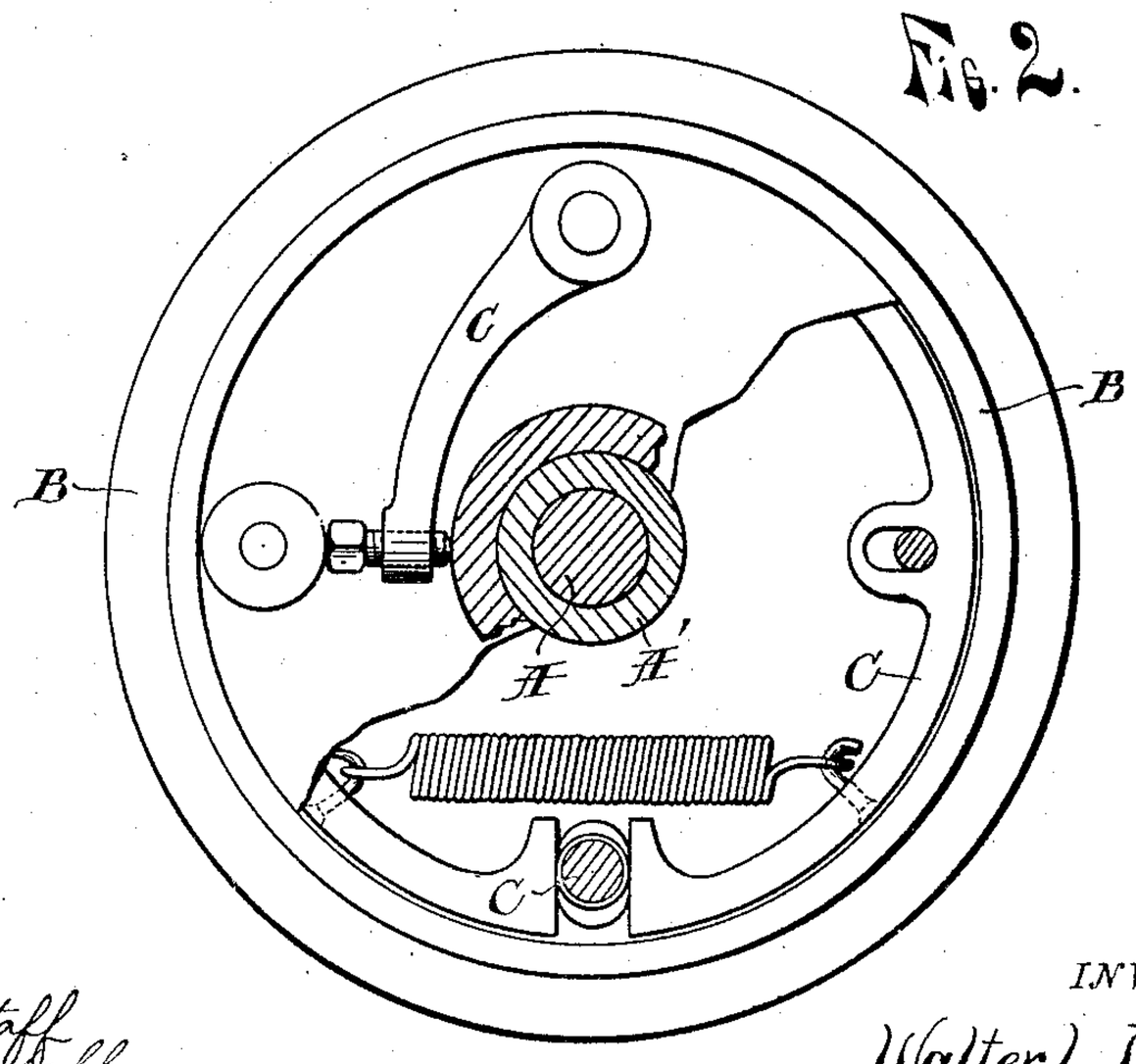


Fig. 2.



WITNESSES.

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NO MODEL. 2 SHEETS—SHEET 2.

Fig. 3.

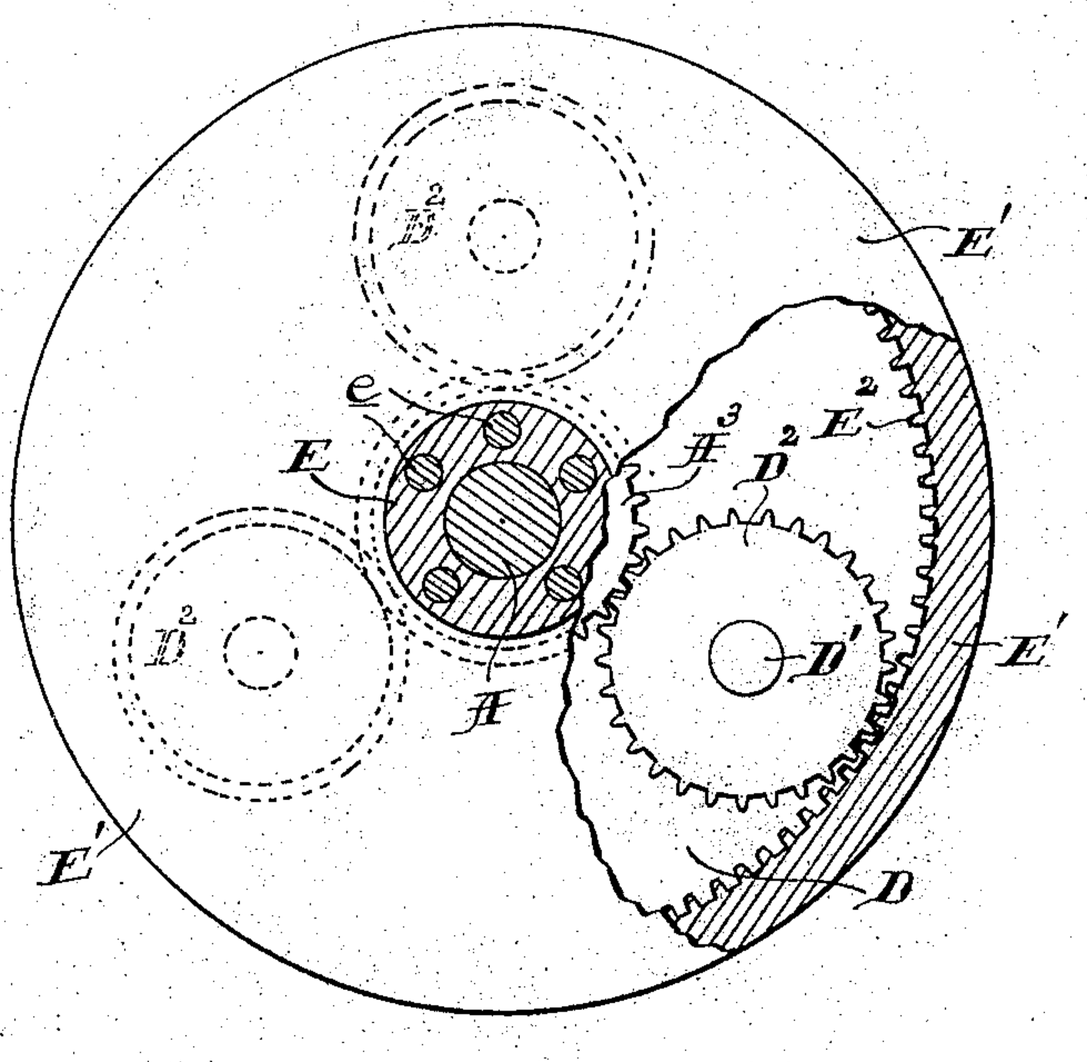
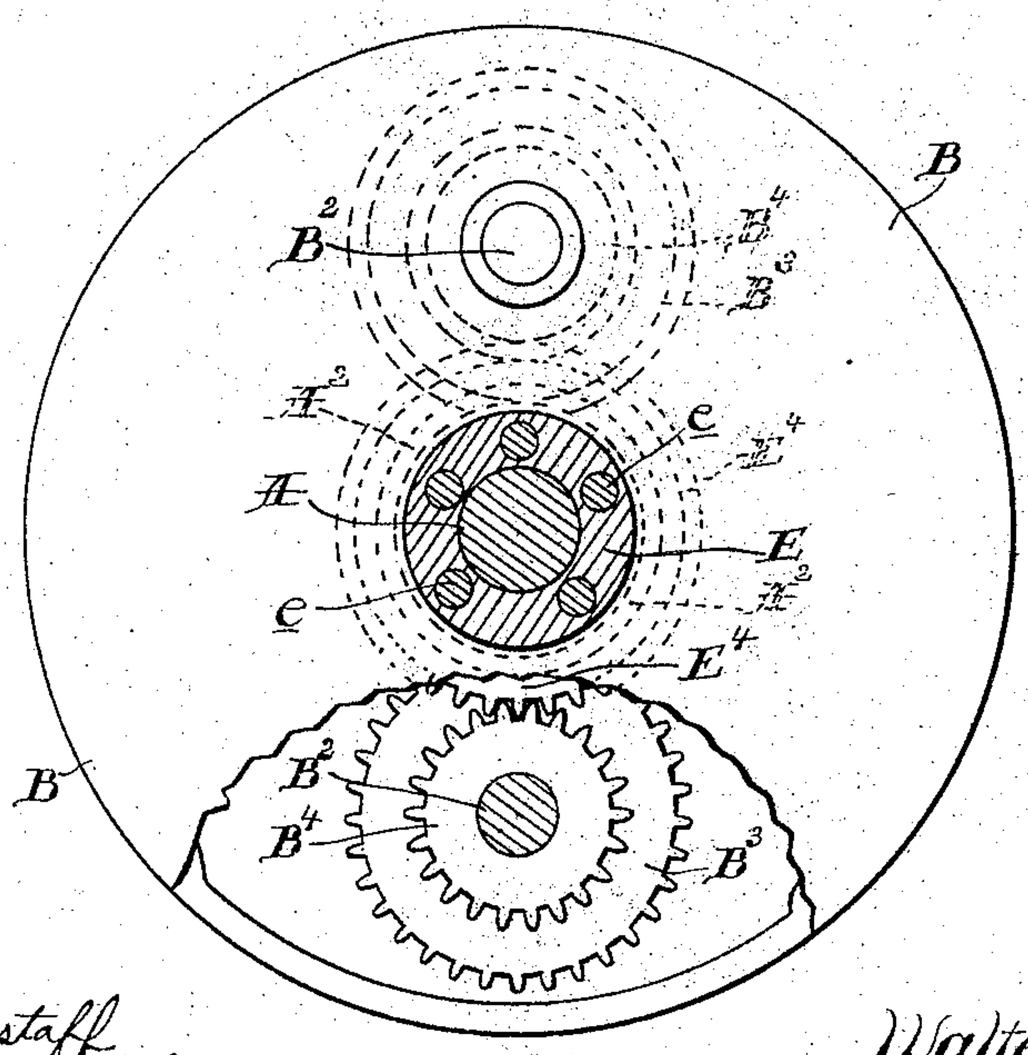


Fig. 4.



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No. 765,498. Patented July 19, 1904.

UNITED STATES PATENT OFFICE.

WALTER L. MARR, OF DETROIT, MICHIGAN.

CHANGE-SPEED GEAR.

SPECIFICATION forming part of Letters Patent No. 765,498, dated July 19, 1904.

Application filed August 3, 1903. Serial No. 167,966. (No model.)

To all whom it may concern:

Be it known that I, WALTER L. MARR, a citizen of the United States of America, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Change-Speed Gears, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to speed-change gearing; and it consists in the improvements hereinafter described, and pointed out in the claim.

Referring to the accompanying drawings, Figure 1 is a sectional view of a change-speed gearing embodying my invention. Fig. 2 is a section on the line 2 2 of Fig. 1, showing the parts back of the section-plane in elevation and partly broken away. Fig. 3 is a section on the line 3 3 of Fig. 1, showing the parts back of the section-plane in elevation and partly broken away. Fig. 4 is a section on the line 4 4 of Fig. 1, showing the parts back of the section-plane in elevation and partly broken away.

The direction of sight in Figs. 2, 3, and 4 is indicated by arrows adjacent to the figures designating the planes of section in Fig. 1.

A is a constantly-rotating shaft. A′, A^2, A^3, and A^4 designate parts rigidly secured to said shaft.

A′ is a clutch-bearing plate and sleeve secured upon the shaft A by a cotter-pin a'.

A^2 is a gear-wheel sleeved upon and secured to the shaft A by a cotter-pin a^2.

A^4 indicates the fly-wheel, which is keyed upon the shaft A by the key a^4.

A^3 is a gear-wheel secured so as to be fixed relatively to the shaft A by pins a^3, extending through said gear-wheel into the hub of the fly-wheel A^4.

E is a sleeve adapted to rotate about the shaft A and divided into two parts for convenience in assembling, which parts in the assembled device are rigidly secured together by pins *e*.

E′ is a disk upon one end of the sleeve E, the outer edge of which is turned inward to form a horizontal cylindrical surface having internal gear-teeth E^2.

E^3 indicates a brake-strap upon the outer surface of the cylindrical portion of the disk E′.

E^4 is a gear-wheel upon the end of the sleeve E opposite to that at which the disk E′ is located.

F is a sprocket-wheel located intermediate the two parts of the sleeve E and rigidly secured as a part of said sleeve by the pin *e*.

B is a hollow casing sleeved upon the hub of the gear-wheel A^2 and upon the sleeve E. The clutch-bearing plate A′ is located within a cylindrical cavity upon one side of the casing B, the clutches upon the plate A′ being adapted to contact the interior walls of said cavity to bind the casing B to the disk A′, and thereby to the shaft A.

B^2 B^2 are arbors bearing in the cylindrical walls of the casing B. Upon each of the arbors B^2 B^2 are located two gear-wheels B^3 B^4, which are rigidly united together, the larger of said gear-wheels, B^3, meshing with the gear-wheel A^2, and the smaller of said gear-wheels, B^4, meshing with the gear-wheel E^4 upon the sleeve E.

D is a disk provided with a cylindrical portion at its outer edge and sleeved upon the hub of the fly-wheel A^4 so as to turn independently thereof.

D^3 is a brake-strap around the cylindrical periphery of the disk D.

D′ is an arbor secured upon the disk D and extending within the cylindrical periphery of the disk E′.

D^2 is a gear-wheel pivoted upon the arbor D′ and meshing with the gear-wheel A^3 and with the internal gear E^2.

The clutch mechanism is indicated by the reference-letter C. As this mechanism is of well-known construction, it is not described in detail; but its various parts are indicated by C.

The operation of the above-described device is as follows: When the clutch C is operated to unite the casing B with the shaft A, the part E is thereby secured from rotation relative to the shaft A by means of the gear-wheels B^3 B^4 meshing with the gear-wheels A^2 and E^4, and the sprocket F, through which the driven part is actuated, is carried at the

same angular velocity as the shaft A. When the clutch mechanism C is released and the brake-strap B′ is tightened upon the casing B so as to retain said casing from rotation, the rotation of the shaft A actuates the gear-wheel B^3, which carries with it the gear-wheel B^4, which actuates the gear-wheel E^4, carrying with it the sleeve E and the sprocket F, at an angular speed less than that of the shaft A in the proportion that the diameter of the gear-wheel B^4 is less than that of the gear-wheel B^3. When the brake-strap B′ is released and the brake-strap B^3 is tightened upon the cylindrical portion of the disk D so as to restrain said disk from rotation, the rotation of the shaft A actuates the gear-wheel D^2 by means of the gear-wheel A^3, the gear-wheel D^2 meshes with the internal gear-teeth E^2 upon the disk E′ and actuates said disk in a direction of rotation opposite that of the shaft A, and the disk E′ carries with it the sprocket-wheel F, which gives the reverse motion to the driven mechanism. When the brake-strap E^3 is tightened upon the cylindrical portion of the disk E′, said disk, and consequently the sprocket-wheel F, rigidly united thereto, is thereby restrained from rotation, and the brake-strap E^3 therefore serves as a brake to stop the mechanism.

What I claim is—

The combination of a driving part having a gear-wheel with exterior teeth fixed thereon, a driven part having a gear-wheel with exterior teeth fixed thereon, said gear-wheels being of different diameters, a member adapted to rotate around the axes of said gear-wheels, planetary gear-wheels pivoted upon an arbor in said member, and meshing with the gear-wheels upon the driving and driven parts, means for limiting the motion of said member, a second gear-wheel upon said driving part, a rack upon the driven part, a member adapted to rotate about the axis of the last-mentioned gear-wheel on the driving part, a gear-wheel pivoted upon an arbor upon the last-mentioned rotatable member, means for limiting the motion of said member, and means for limiting the motion of said rack.

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

WALTER L. MARR.

Witnesses:

LEWIS E. FLANDERS,

OTTO F. BARTHEL.