

No. 742,721.

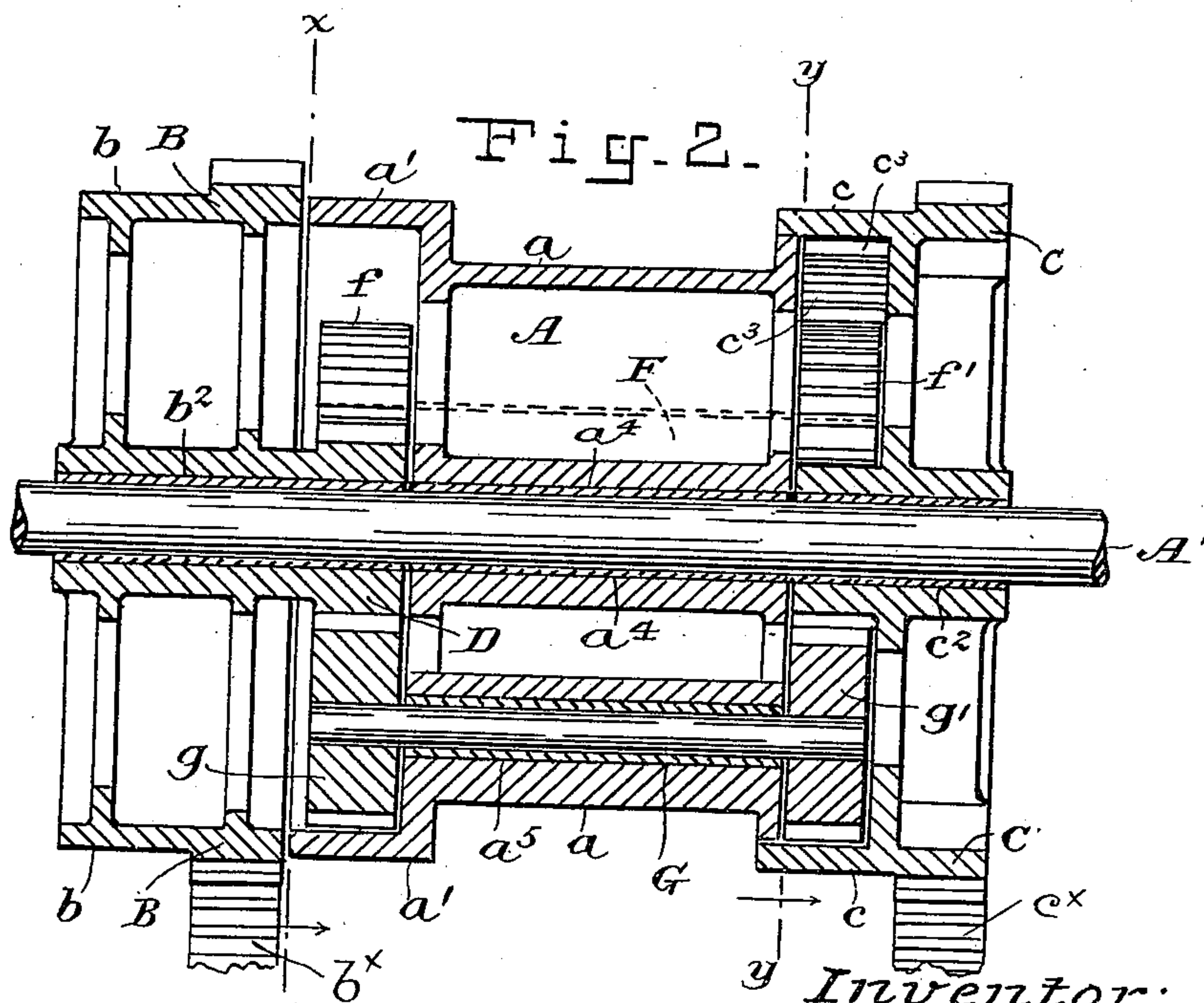
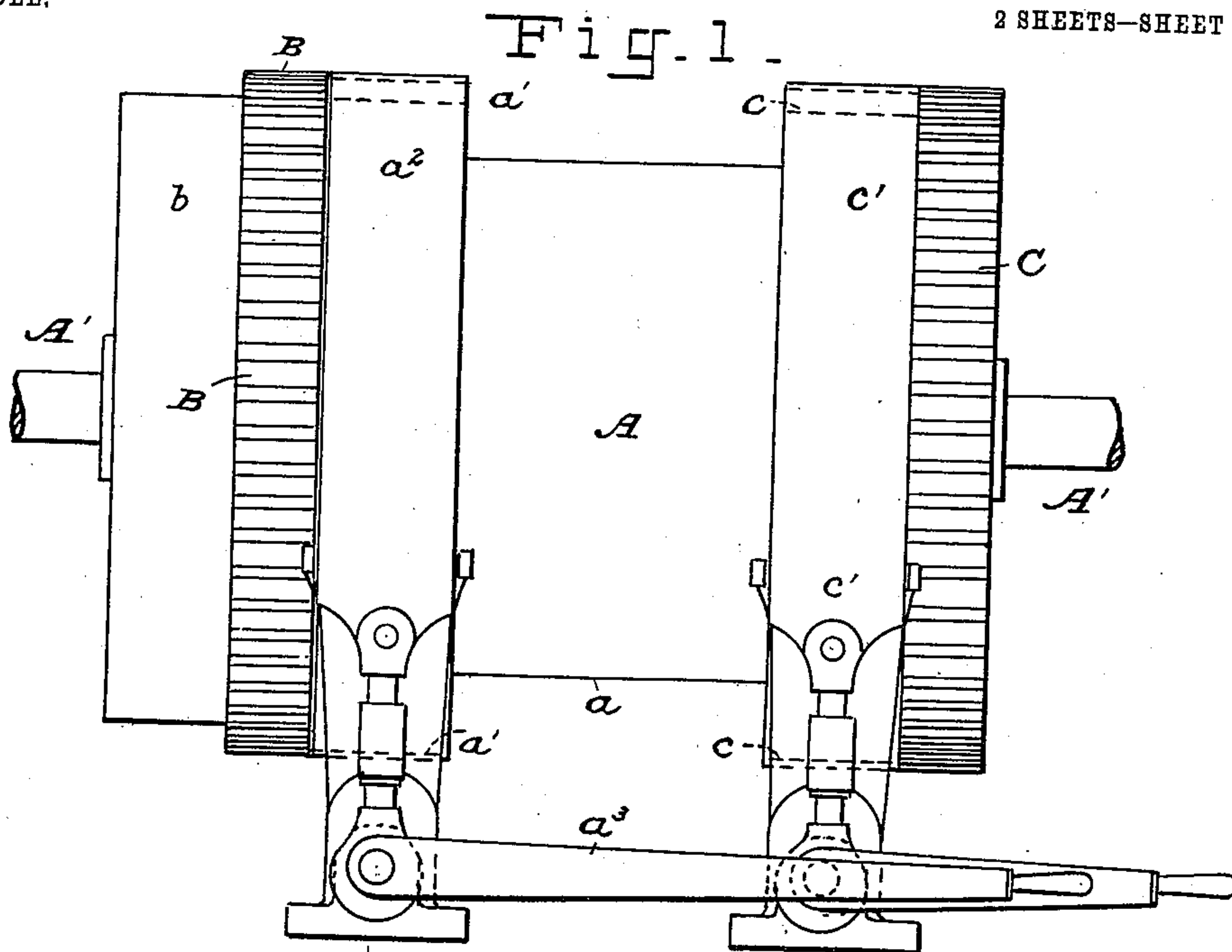
PATENTED OCT. 27, 1903.

A. McNAMARA.  
HOISTING OR HAULING DRUM.

APPLICATION FILED FEB. 28, 1903.

NO MODEL.

2 SHEETS—SHEET 1.



Witnesses:  
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2 SHEETS—SHEET 2.

Fig. 3.

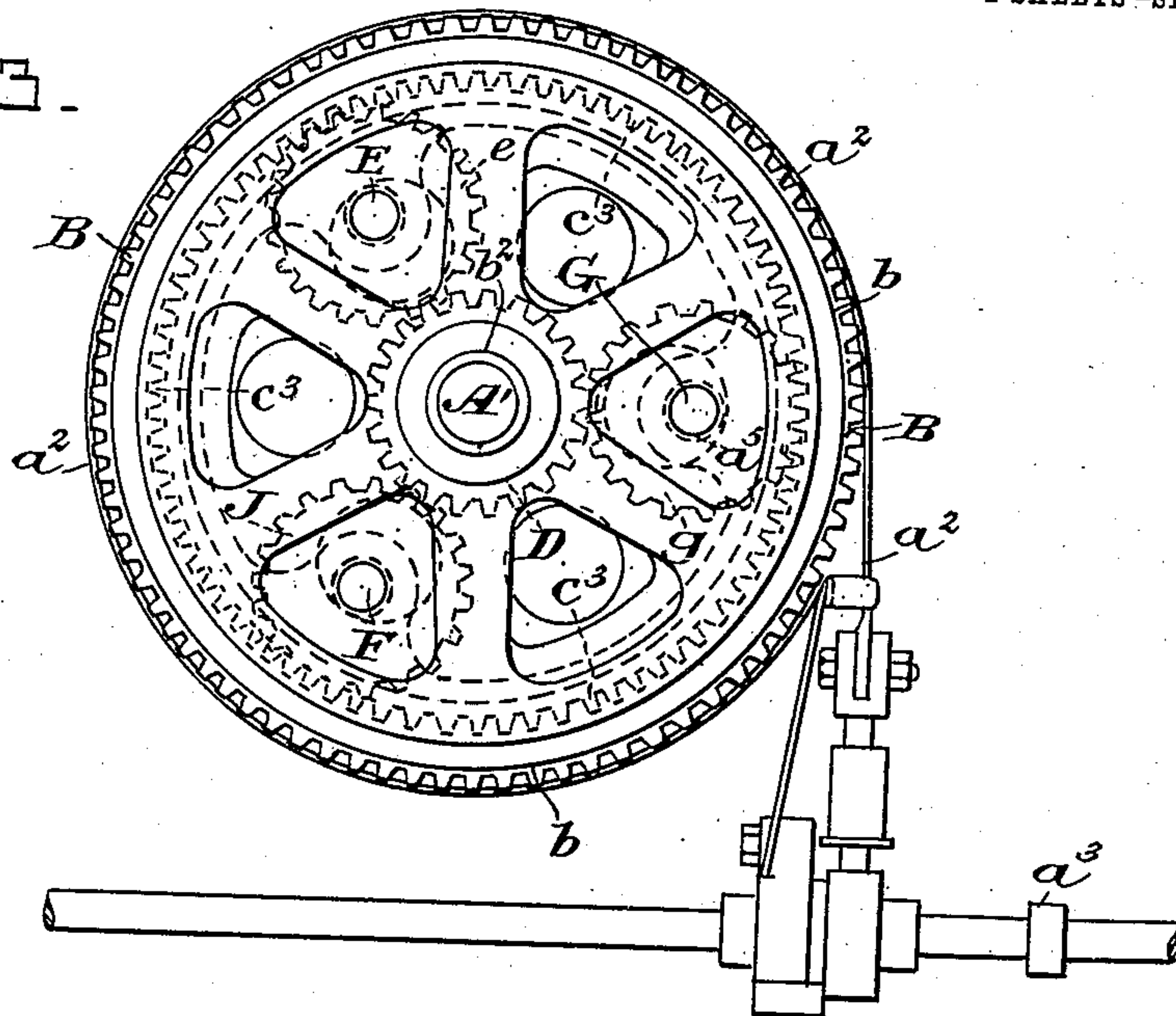


Fig. 4.

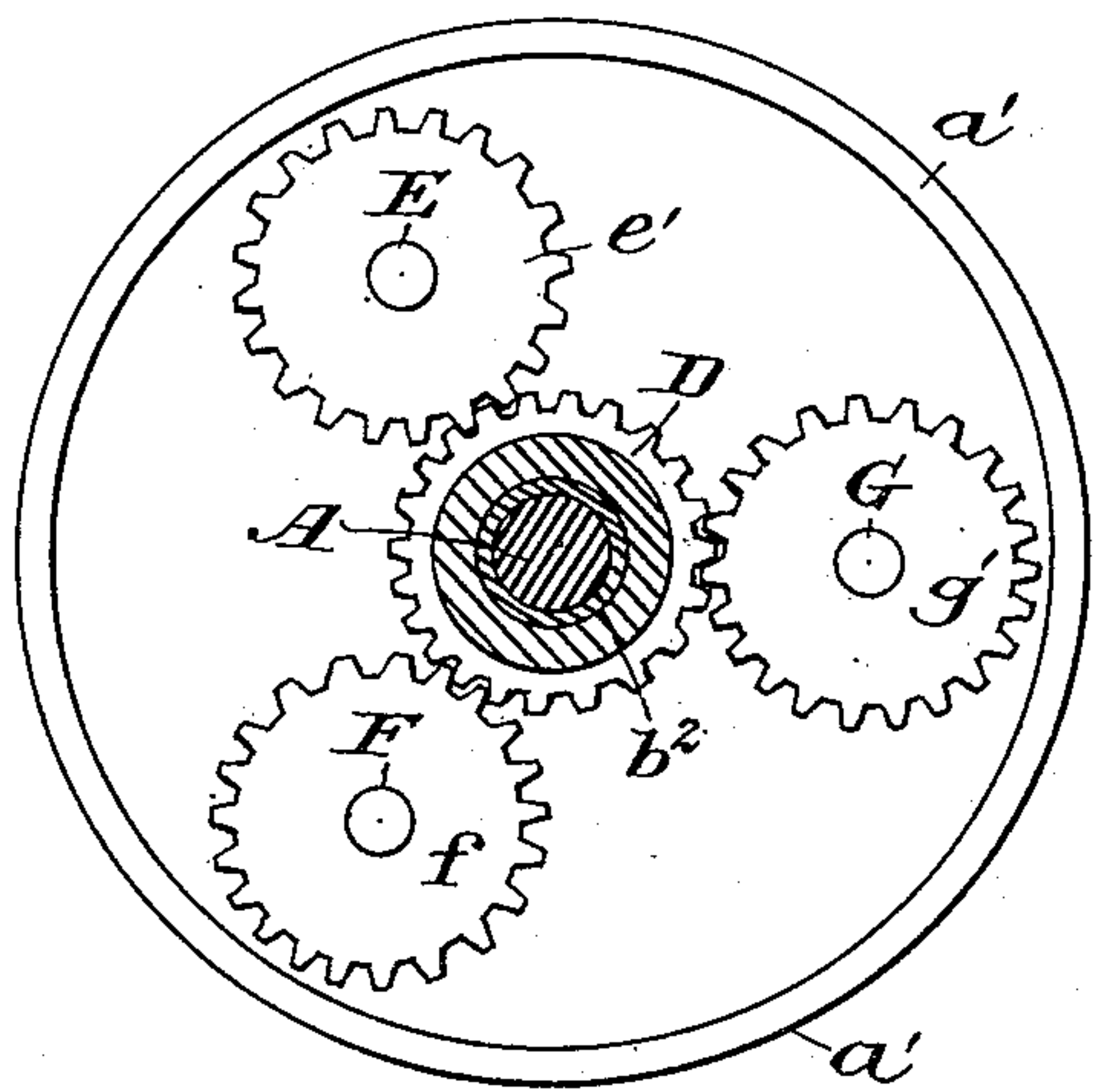
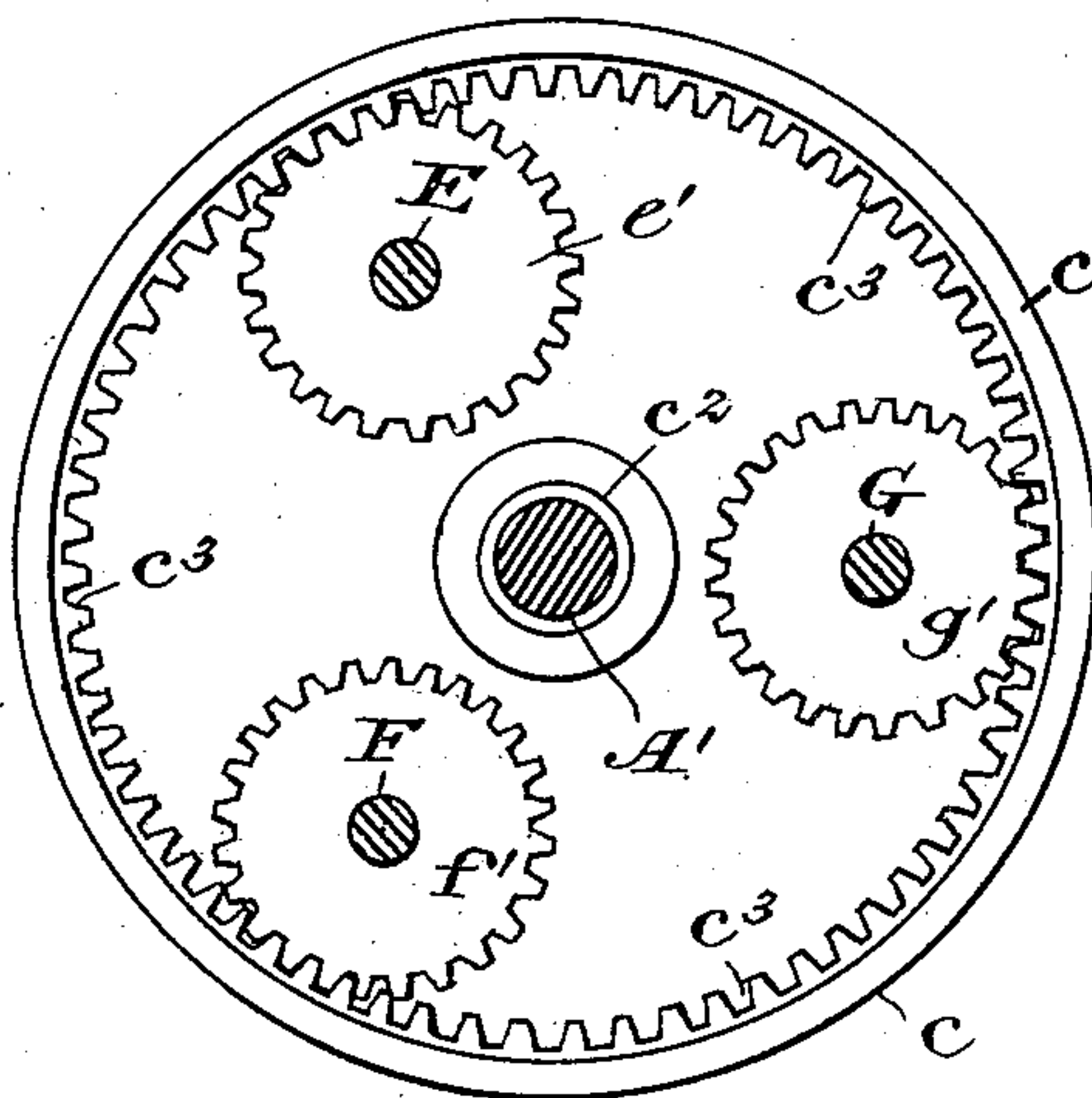


Fig. 5.



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# UNITED STATES PATENT OFFICE.

ALEXANDER McNAMARA, OF JOHANNESBURG, TRANSVAAL.

## HOISTING OR HAULING DRUM.

SPECIFICATION forming part of Letters Patent No. 742,721, dated October 27, 1903.

Application filed February 28, 1903. Serial No. 145,515. (No model.)

*To all whom it may concern:*

Be it known that I, ALEXANDER McNAMARA, a citizen of the United States, residing at Johannesburg, Transvaal, have invented certain new and useful Improvements in or Relating to Hoisting or Hauling Drums and the Like, of which the following is a specification.

This invention relates to hoisting or hauling drums and the like.

The objects of the invention are, first, to provide an internal gearing for such drums capable of being used either as a simple or direct gearing or as a differential or compound gearing of increased efficiency or lifting power with the minimum of increase in the weight of the gearing; secondly, to utilize all the power available for the actual lifting of the load by concentrating the power within the drum, so as to obviate the employment of external counter-shafts in order to compound the gearing; thirdly, to provide for the driving of the drum at different speeds through a differential or compound gearing to obtain different lifting powers in a simple and efficient manner, and, fourthly, to effect an even distribution of the lifting strain across the entire periphery or winding portion of the drum.

The invention will be fully described by aid of the accompanying drawings, wherein—

Figure 1 shows a front elevation of the winding-drum; Fig. 2, a section through the drum and gearing longitudinally of the drum-shaft, the brake mechanism being omitted; Fig. 3, an end elevation; Fig. 4, a section on line  $x x$ , Fig. 2; Fig. 5, a section on line  $y y$ , Fig. 2.

A designates the drum, constructed with a winding-surface  $a$ , around which the hauling rope or cable is coiled. On one end of the drum A is provided a brake-face  $a'$  for controlling the movement thereof. Around the brake-face  $a'$  is arranged a brake-band  $a^2$  of any suitable construction (see Fig. 1) capable of being operated by means of the brake-lever  $a^3$  to grip or tighten on the brake-face  $a'$ .

The drum A is mounted on the main drum-shaft A'. The shaft A' is stationary and carried by suitable standards or supports at a

convenient height. The drum A has a free bearing on the shaft A' or is capable of revolving freely thereon.

$a^4$  is a bush or liner fitted in the center of the winding-drum A around the shaft A'. 55

At each end of the drum A and on the shaft A' is mounted a spur-wheel B C. The spur-wheel B is provided with a brake-face  $b$ , around which is arranged a brake-band for controlling the wheel B. The band may be of similar construction to the brake-band  $a^2$  or of any other suitable form. The spur-wheel C is also provided with a brake-face  $c$  and brake-band  $c'$  (see Fig. 1) for controlling the wheel. 65

The spur-wheels B C are provided with bushes or liners  $b^2 c^2$ , surrounding the drum-shaft A'.

The driving-pinions mesh with the spur-wheels B C, as shown at  $b^x c^x$ , Fig. 2. 70

The boss or center of the spur-wheel B projects into the center of that portion of the winding-drum forming the brake-face  $a'$ , where it is formed into a pinion D. Instead of forming the pinion D in one piece with the boss of the spur-wheel B it may be made a separate part and be keyed or otherwise fixed on the spur-wheel center inside the drum. 75

The interior of the winding-drum A is constructed to form bearings for three counter-shafts E F G, so that each of said counter-shafts is capable of rotating freely inside the drum. The bearings for the several counter-shafts are formed in the drum, near the rim or periphery thereof, for the purpose of obtaining a leverage against the load. 85

$a^5$  represents bushes fitted in the bearings provided in the drum for the several counter-shafts E F G.

On the extremities of the three counter-shafts E F G in the annular space formed around the pinion D are fixed the three pinions  $e f g$ , all of which mesh or gear with said pinion D. The other extremities of the counter-shafts E F G project beyond the end of the drum A into the annular recess formed in the interior of the spur-wheel C by the brake-face  $c$ , and on the extremities thereof are fixed the three pinions  $e' f' g'$ . 95

Around the inside of the brake-face  $c$  are 100



formed internal teeth  $c^3$ , which form a concentric rack with which the several pinions  $e' f' g'$  mesh or gear.

The several methods of driving the drum A are as follows: When the pinions on the main driving-shaft are in gear with both of the spur-wheels B C, this effects the direct transmission of the power to the drum, thus providing a simple or direct gearing suitable for a high speed and a light load. When the spur-wheels B C are both being driven, the drum A is locked to the wheels B C through the medium of the internal gearing. If the spur-wheel B is held stationary on the drum-shaft A' by means of a brake-band on the brake-face  $b$  and the power applied through the spur-wheel C, this approximately doubles the purchase by reducing the speed one-half. The motion of the spur-wheel C is transmitted through the concentric rack or internal teeth  $c^3$  on the inside of the brake-face  $c$  to the pinions  $e' f' g'$ , which causes the pinions to travel around in the annular space between the teeth  $c^3$  and the boss of the spur-wheel and to carry with them or rotate the drum A. The pinions  $e f g$  on the other extremities of the counter-shafts E F G roll around the pinion D on the stationary spur-wheel B. By holding or fixing the spur-wheel C through the medium of the brake-band  $c'$  on the brake-face  $c$  and driving through the spur-wheel B the pinion D is rotated, which drives the pinions  $e f g$  and their counter-shafts and with them the drum A. The pinions  $e' f' g'$ , meshing with the internal teeth or concentric rack  $c^3$ , which is now stationary, roll around in the annular space formed between the teeth  $c^3$  and the boss of the spur-wheel C. By thus gearing the drum A with the spur-wheel B, I obtain a purchase approximately equal to six times that obtained when driving the drum direct or through both of the spur-wheels B and C, as previously described.

By varying the size of the driving-pinions in gear with the teeth of the two spur-wheels B C the purchase or power to be developed may be further increased or decreased, as may be desired.

In the drawings the drum A is shown of hollow construction, shaped to form the bearings for the three counter-shafts E F G. Instead of the form shown the drum may be made solid and three (more or less) parallel holes be formed through it to provide bearings for the counter-shafts.

The drum is described and shown fitted with three counter-shafts for the internal differential and compound gearing. In some cases, according to the nature of the work for which the drum is intended to be used, one, two, four, or more of such counter-shafts may be provided. The counter-shafts may be arranged in the interior of the drum at any suitable distance from the center of the drum-shaft in order to obtain the desired leverage in lifting the load.

What I claim as my invention, and desire to protect by Letters Patent, is—

1. In a hoisting or hauling drum or the like the combination with the drum of a counter-shaft journaled in the interior thereof, pinions fixed on each extremity of said counter-shaft, a driving-pinion in gear with the pinion on the extremity of the counter-shaft on one end, and an internally-toothed wheel in gear with the pinion on the extremity of the counter-shaft at the other end, and means for imparting motion to the driving-pinion and the internally-toothed wheel for driving the drum through the pinions on either extremity of the counter-shaft, substantially as described.

2. In a hoisting or hauling drum or the like the combination with the drum of a plurality of counter-shafts journaled in the interior of the drum between its axis of rotation and the periphery thereof, pinions fixed on each extremity of each of the counter-shafts, a driving-pinion in gear with the pinions on the extremities of the counter-shafts at one end of the drum, and an internally-toothed wheel in gear with the pinions on the extremities of the counter-shafts at the other end of the drum, and means for imparting motion to the driving-pinion or to the internally-toothed wheel for driving the drum substantially as described.

3. In a hoisting or hauling drum or the like, in combination, a drum, bearings formed through the drum parallel to the axis thereof, counter-shafts arranged in said bearings parallel to the axis of the drum, pinions fixed on each extremity of the counter-shafts at one end of the drum, a driving-pinion in gear with these several pinions, means for imparting motion to said driving-pinion to drive the several pinions in gear therewith, an internally-toothed wheel or concentric rack in gear with the several pinions on the other extremities of the counter-shafts, means for imparting motion to the internally-toothed wheel or concentric rack for driving the drum through the pinions in gear with the toothed wheel or concentric rack, means for holding the toothed wheel or concentric rack stationary while driving through the gearing at the other end of the drum, and means for holding the driving-pinion stationary while driving through the internally-toothed wheel or concentric rack, substantially as described.

4. In a hoisting or hauling drum or the like in combination, a drum, a plurality of bearings formed in the interior thereof between the axis and periphery and parallel to the axis, counter-shafts journaled in said bearings, pinions fixed on each extremity of each of the several counter-shafts, a driving-pinion in gear with the several pinions on the extremities of the counter-shaft at one end of the drum, a spur-wheel connected with the driving-pinion for imparting motion to the latter to drive the drum through the medium of the pinions in gear with said driving-pin-



ion, means for driving the spur-wheel and for holding it and the driving-pinion stationary when driving through the gearing at the other end of the drum, an internally-toothed wheel in gear with the pinions on the extremities of the counter-shafts at the other end of the drum, a spur-wheel connected with said internally-toothed wheel or concentric rack, and means for driving said spur-wheel and for holding it stationary when driving through the gearing at the opposite end of the drum, substantially as described.

5. In a hoisting or hauling drum or the like in combination, the drum, the brake-face formed thereon, the brake-band encircling the brake-face, the internal bearings formed in the interior of the drum between the axis and periphery, and parallel to the axis, the counter-shafts journaled in said bearings parallel with the axis of the drum, pinions fixed on each extremity of the counter-shafts, the driving-pinion meshing with the several pinions on the extremities of the counter-shafts at one end of the drum, the spur-wheel connected with the driving-pinion, the brake-face formed on the spur-wheel, and a brake-band arranged thereon, an internally-toothed wheel in gear with the several pinions on the extremities of the counter-shafts at the other end of the drum, a spur-wheel connected with the internally-toothed wheel, a brake-face formed on the spur-wheel and a brake-band arranged thereon, and means for imparting motion to the drum through the two spur-wheels or one or other of them, substantially as described.

6. In combination the drum A loosely mount-

ed on the drum-shaft A', the bush or liner  $a^4$ , the brake-face  $a'$  and the brake-band  $a^2$  encircling the same, the several bearings formed in the interior of the drum between the axis and periphery and parallel to the axis, the several counter-shafts E F G journaled in the interior of the drum A parallel to the axis thereof, the pinions  $e f g$  affixed to the extremities of the counter-shafts inside the recess formed by the brake-face  $a'$ , the spur-wheel B loosely mounted on the drum-shaft A' at one end of the drum, the brake-face  $b$  and a brake-band arranged thereon, the pinion D formed on the boss of the spur-wheel B projected into the interior of the recess formed by the brake-face  $a'$ , and meshing with the pinions  $e f g$ , the bush or liner  $b^2$  of the spur-wheel B, the spur-wheel C loosely mounted on the drum-shaft A' at the other end of the drum, the internal teeth or concentric rack  $c^3$  formed in the spur-wheel C, the brake-face  $c$  and brake-band  $c'$ , the pinions  $e' f' g'$  on the extremities of the counter-shafts E F G located in the interior of the internally-toothed portion of the spur-wheel C, and meshing with the internal teeth or concentric rack  $c^3$ , the bushes or liners  $c^2$ , and means for imparting motion to the drum A direct through both the spur-wheels B C or one or other of them, substantially as described.

In witness whereof I have hereunto set my hand in the presence of two subscribing witnesses.

ALEXANDER McNAMARA.

Witnesses:

CHAS. OVENDALE,  
J. SERIM GEOROR.