

W. M. McCARTNEY.
VARIABLE FRICTION GEARING.

(Application filed Nov. 10, 1900.)

(No Model.)

2 Sheets—Sheet 1.

FIG. 1.

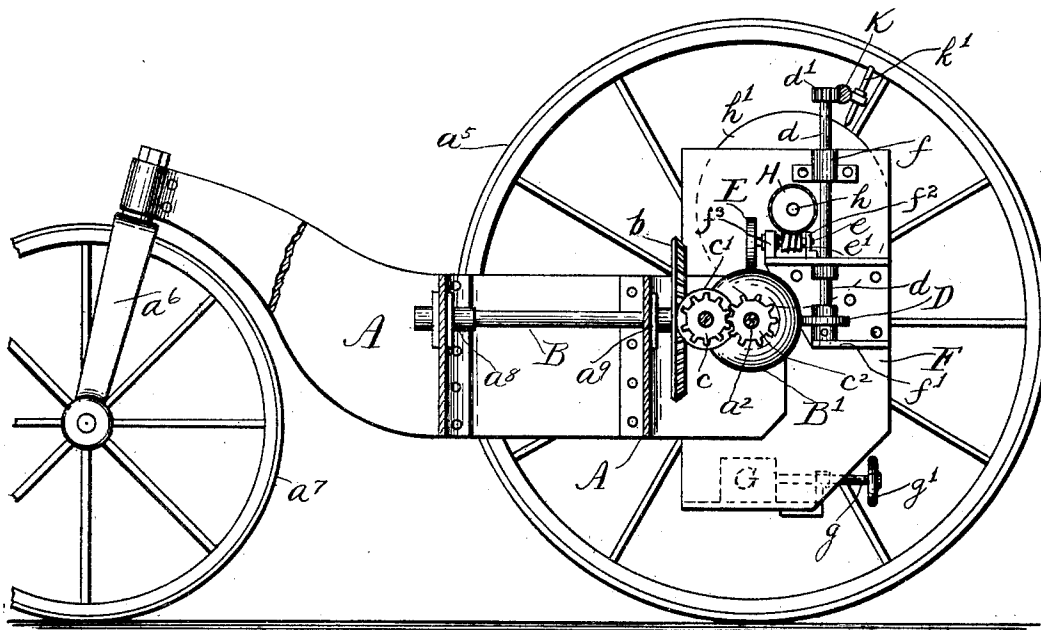
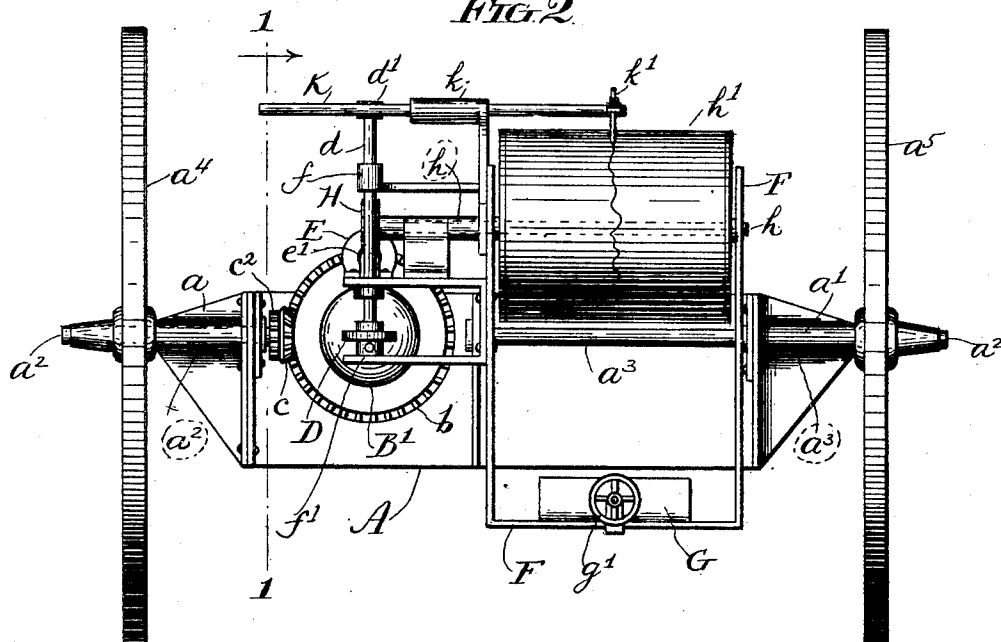


FIG. 2.



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No. 679,569.

Patented July 30, 1901.

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FIG 3

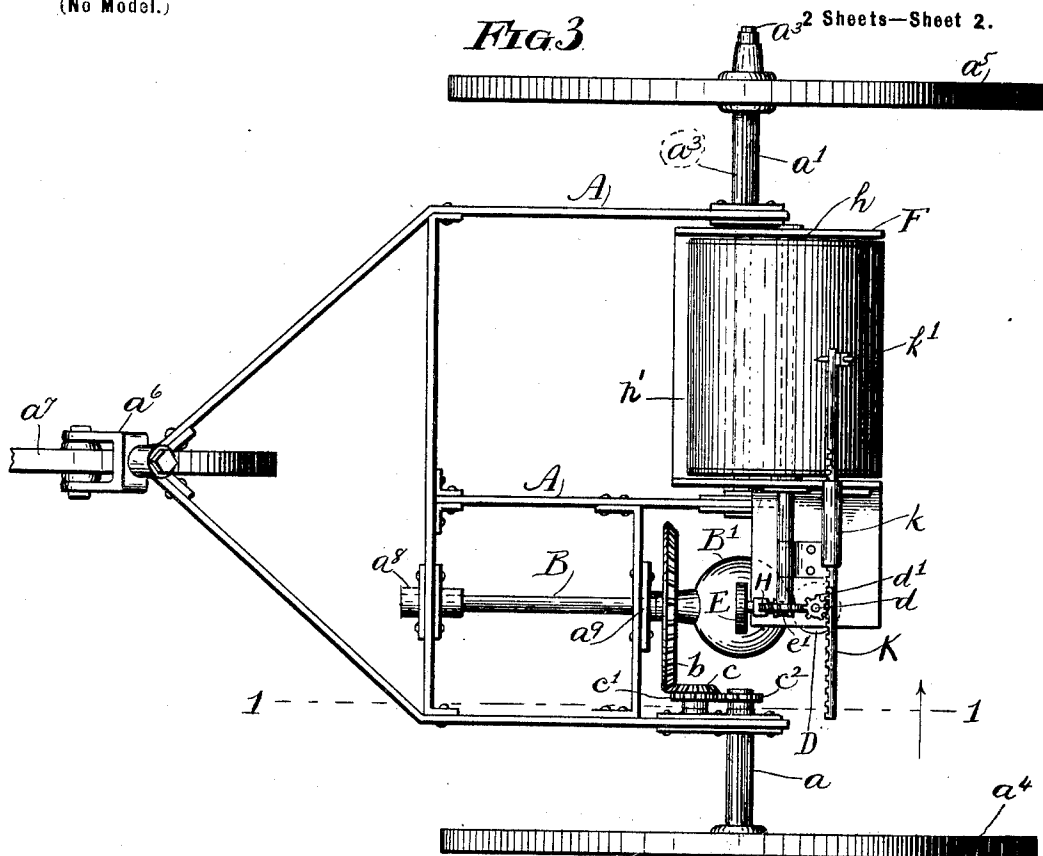
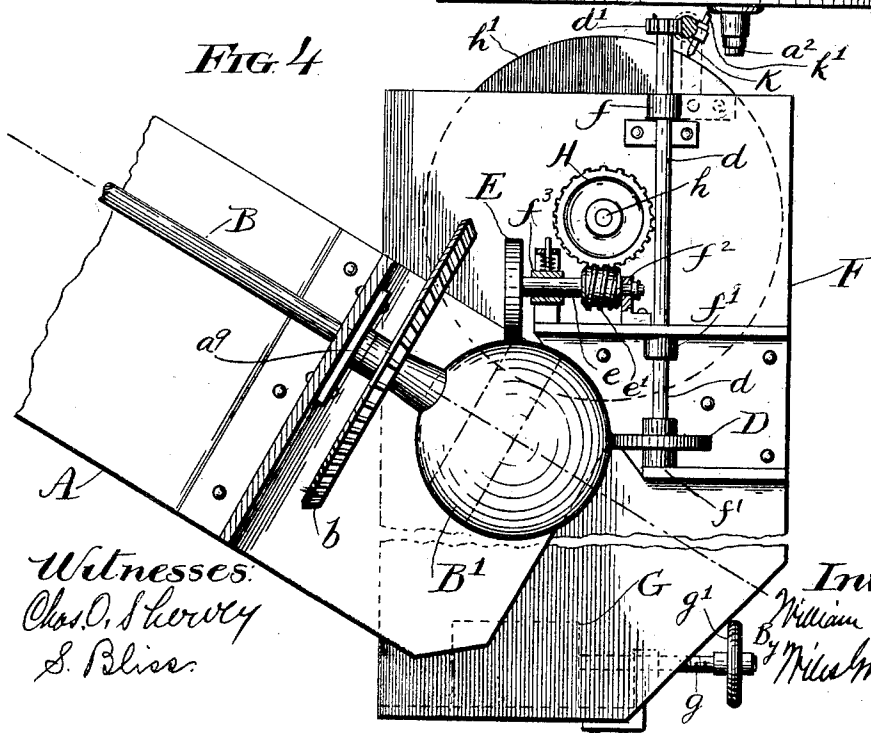


FIG 4



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UNITED STATES PATENT OFFICE.

WILLIAM M. MCCARTNEY, OF CHICAGO, ILLINOIS.

VARIABLE FRICTION-GEARING.

SPECIFICATION forming part of Letters Patent No. 679,569, dated July 30, 1901.

Application filed November 10, 1900. Serial No. 36,061. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM M. MCCARTNEY, a citizen of the United States of America, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Variable Friction-Gearing, of which the following is a specification.

My invention relates to certain improvements in variable friction-gearing, the purpose of which is to provide a gear which by a proper change in the axis of oscillation of one of the parts may be made to produce a variation in the speed of the driven portion proportional either to the sine or cosine of the angle through which the said axis is moved. Primarily the gear has been designed for use in a certain profile-machine which I have invented and which is made the subject of a separate application of even date herewith; but the gear is capable of use in any other apparatus in which a variation of the character above set forth is desirable. For the purpose of clearly setting forth the invention in connection with a useful application thereof it will be illustrated and described in its appropriate arrangement with said profile-machine. The machine, however, outside of the variable gearing herein claimed is not claimed in this application, having been, as before stated, made the subject of a separate application.

In the drawings, Figure 1 is a longitudinal vertical section of a complete machine in line 1 of Fig. 3. Fig. 2 is a rear elevation of said machine; Fig. 3, a plan of the same, and Fig. 4 an enlarged longitudinal vertical section in the same plane as Fig. 1 and broken away at certain points.

Referring to the drawings, A is a framework, preferably of open construction and providing journals a a' for axles a^2 a^3 , preferably in the same line and bearing opposite supporting-wheels a^4 a^5 . In the end of the frame is pivoted a fork a^6 , in which is journaled a wheel a^7 , completing the supporting-wheels of the frame. In the frame is journaled a horizontal shaft B, Fig. 3, by means of the bearings a^8 a^9 , said shaft bearing a bevel-gear b in mesh with a bevel-pinion c , fast to a spur-gear c' , suitably journaled in the frame and in mesh with a spur-gear c^2 on the axle a^2 . On the end of the shaft B beyond the

bevel-gear is a sphere B' , upon the surface of which run two friction-rollers D E, Fig. 4. The friction-roller D is fast on a shaft d , journaled in bearings f f' on a swinging frame F, pivoted upon the axle a^3 . (See also Fig. 2.) Said swinging frame also supports journals f^2 f^3 , in which is a shaft e , carrying the friction-wheel E. A weight G, adjustable longitudinally of the apparatus by means of a screw g and hand-wheel g' , furnishes means for balancing the swinging frame upon the axle and maintaining it in a vertical position. The shafts B d e are in the same plane, and the shafts d e are at right angles to each other. The friction-wheels D E are arranged just a quarter of the circumference of the sphere apart. When the supporting-wheels rest upon a horizontal surface, at which time the shaft B is horizontal, the friction-wheel D rests upon the pole of the sphere and the wheel E upon the equator. On the shaft e is a worm e' , Fig. 4, in mesh with a gear H, on a shaft h , journaled in the frame and carrying a drum h' , upon which paper may be stretched or other suitable surface provided to receive the automatic record of the device. Upon the upper end of the shaft d is a pinion d' , in mesh with a rack K, guided longitudinally in a sleeve k , supported by the swinging frame, said rack extending alongside of the surface of the cylinder and bearing a recording-pencil k' in contact with said surface. By means of this gearing the friction-wheel E rotates the drum, and the friction-wheel D moves the pencil longitudinally thereof.

If the axis of rotation of the sphere be so adjusted as to bring one of the friction-wheels upon the equator of the same, the maximum speed will be imparted to said friction-wheel, and if the axis of rotation be swung from this position in either direction in the plane of the axis of the friction-wheel the speed of the friction-wheel will decrease until it becomes nothing at the pole, and the variation will be in proportion to the cosine of the angle which the axis of the sphere makes with that of its original position. Starting with the friction-wheel on the pole a similar change in the axis of rotation of the sphere will cause a variation in the speed proportional to the sine of the angle of change. The

rotating sphere can be used with either one or both of the friction-wheels shown, and other variation is also possible in the particular form of the invention. For that reason
5 I do not limit myself to the specific details.

I claim as new and desire to secure by Letters Patent—

1. The combination with a rotatable sphere,
10 of two rotatable friction-wheels having their axes in the plane of the axis of rotation of the sphere, and their surfaces in contact with said sphere at points separated one-quarter of the circumference thereof, and means of support for said sphere permitting angular
15 movement of the axis of rotation of the sphere about the center of the sphere, and in the plane of the axes of the wheels; substantially as described.

2. The combination with a rotatable sphere,

of two rotatable friction-wheels having their 20 axes in the plane of the axis of rotation of the sphere, and their surfaces in contact with said sphere at points separated a given portion of the circumference thereof, and means of support for said sphere permitting angular 25 movement of the axis of rotation of the sphere about the center of the sphere and in the plane of the axes of the wheels; substantially as described.

In witness whereof I have hereunto set my 30 hand, at Chicago, in the county of Cook and State of Illinois, this 6th day of November, A. D. 1900.

WILLIAM M. MCCARTNEY.

Witnesses:

CHAS. O. SHERVEY,
S. BLISS.