United States Patent [19]

Benjamin

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[54] **CENTRIFUGAL THRUST MOTOR**

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[21] Appl. No.: **153,782**

Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 836,815, June 26, 1969, abandoned.

[52] **U.S. Cl.** ..... **74/84 S**, 60/10

[51] **Int. Cl.** **F03g 3/00**

[58] **Field of Search** ..... 60/1, 10; 74/61, 74/87, 84 S

[56] **References Cited**

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[57] **ABSTRACT**

A centrifugal thrust motor for vehicles or the like including a frame member having a continuous track portion and a rotating shiftable shaft positioned within said track portion; at least two weight support members each having a working length secured to the shaft, and a drive mechanism provided for rotating the shaft in a direction transverse to the axis of the shaft, whereby when the shaft is rotating, upon shifting the shaft, the working length of the remainder of the weight support members in at least one point of the rotation of the weights, so as to move a vehicle or the like by providing a thrust in a direction transverse to the shaft, with appropriate braking for the opposite thrust of the weights.

10 Claims, 9 Drawing Figures

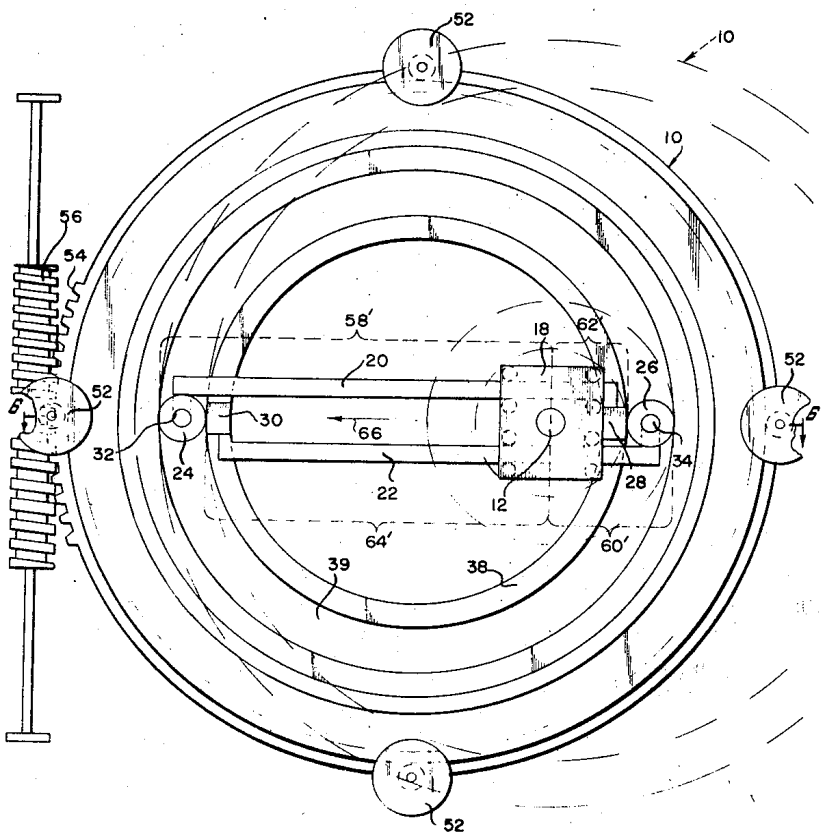

Fig. 1

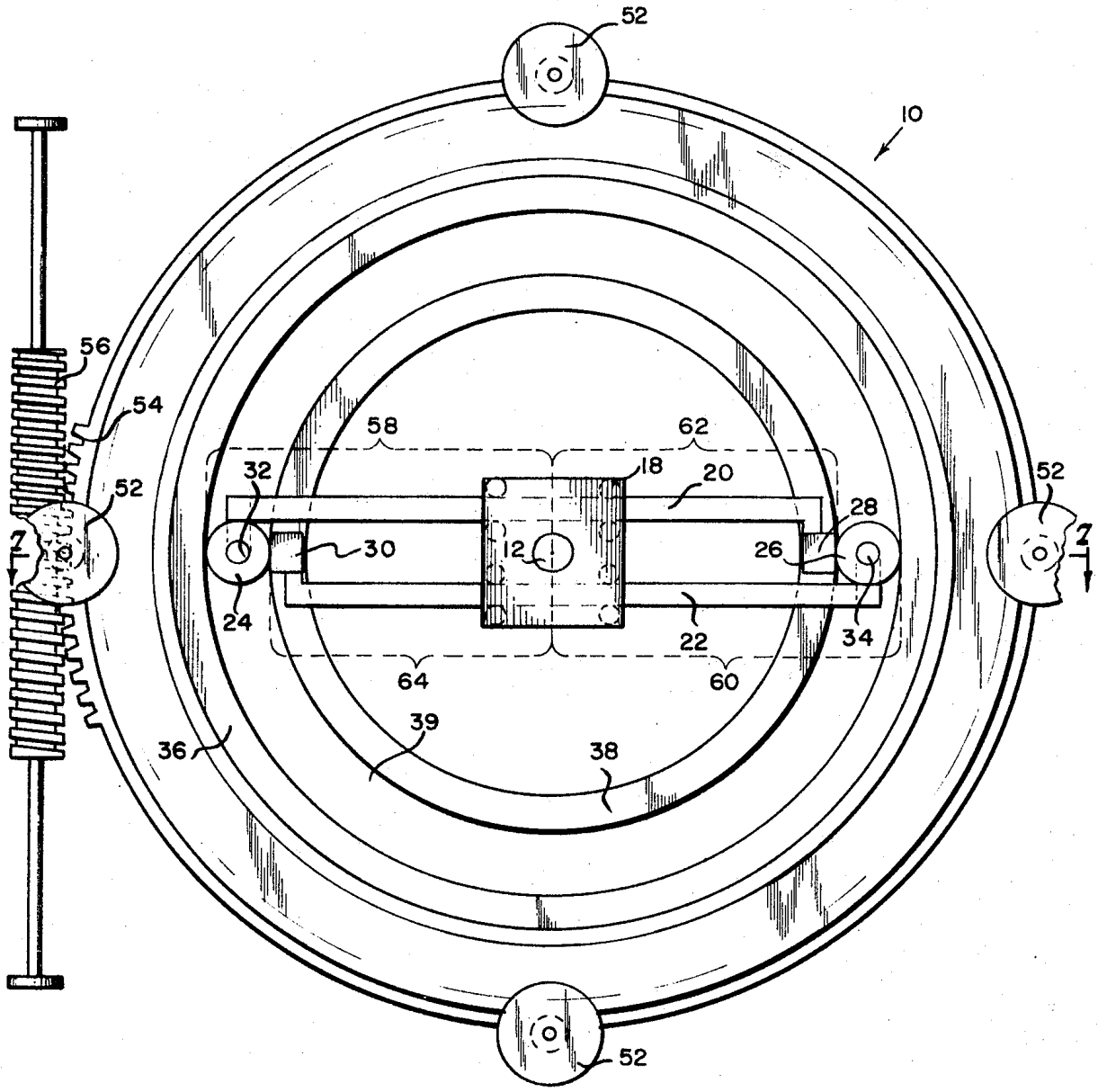

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Fig. 2

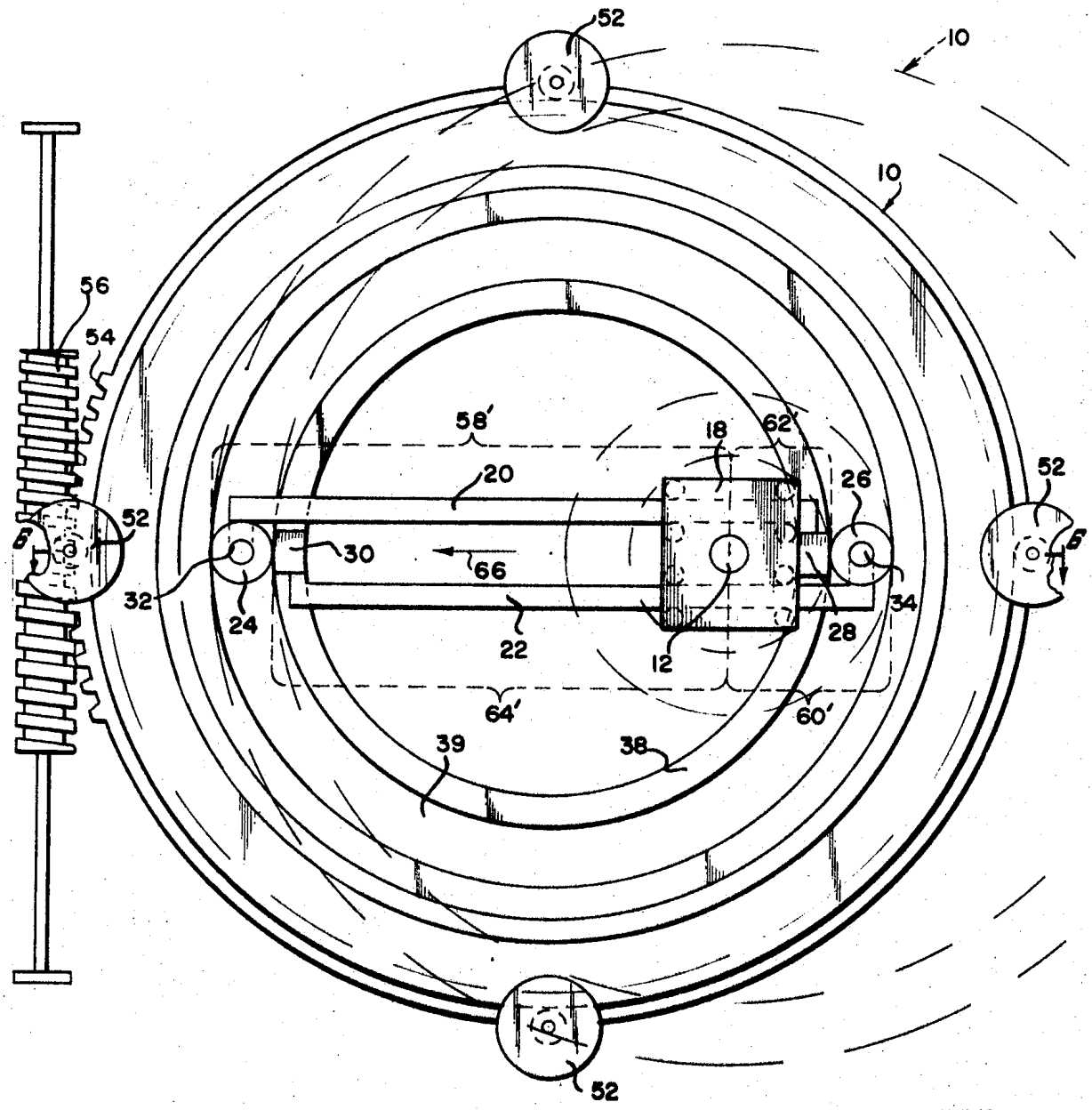

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Fig. 3

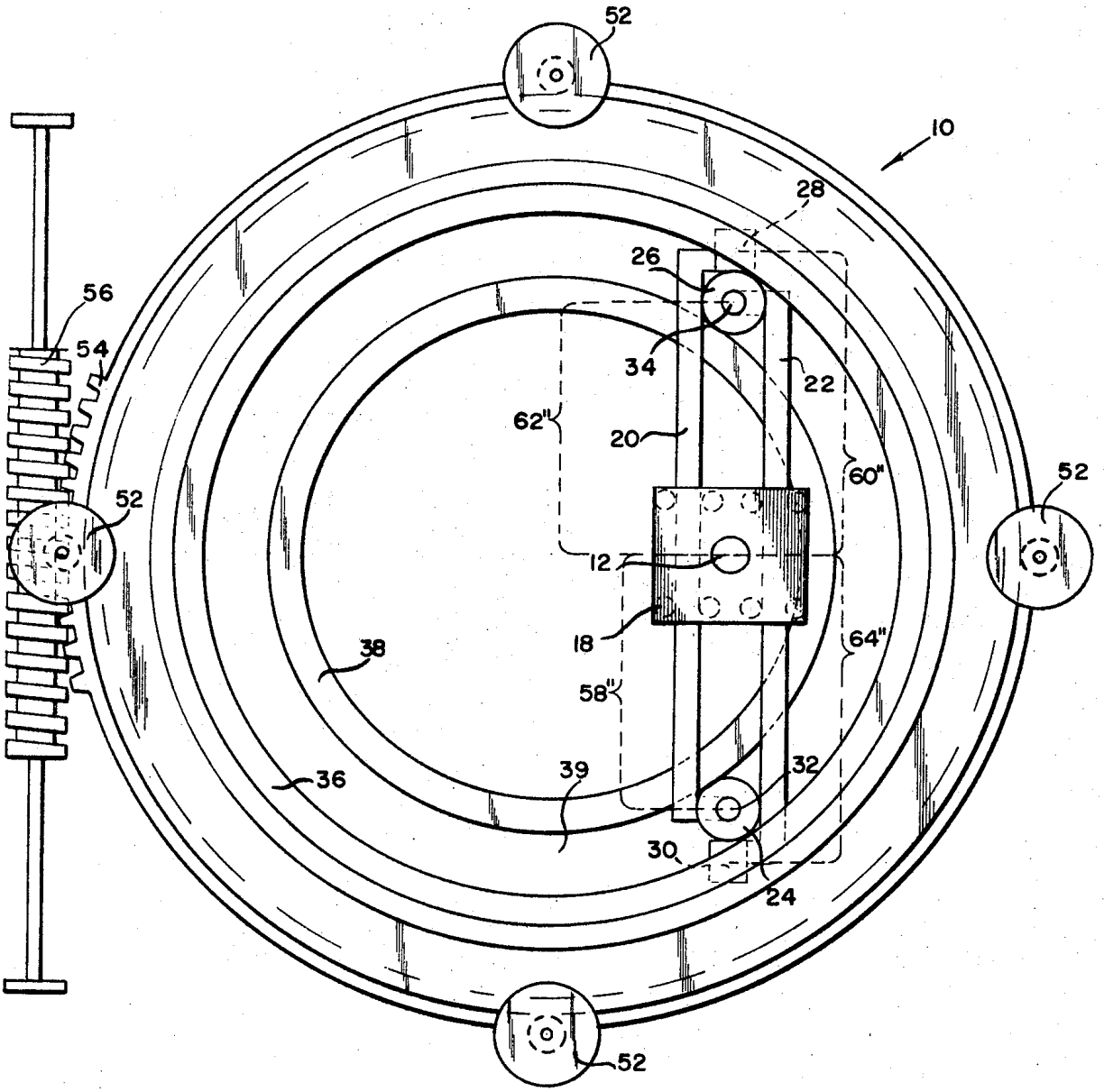

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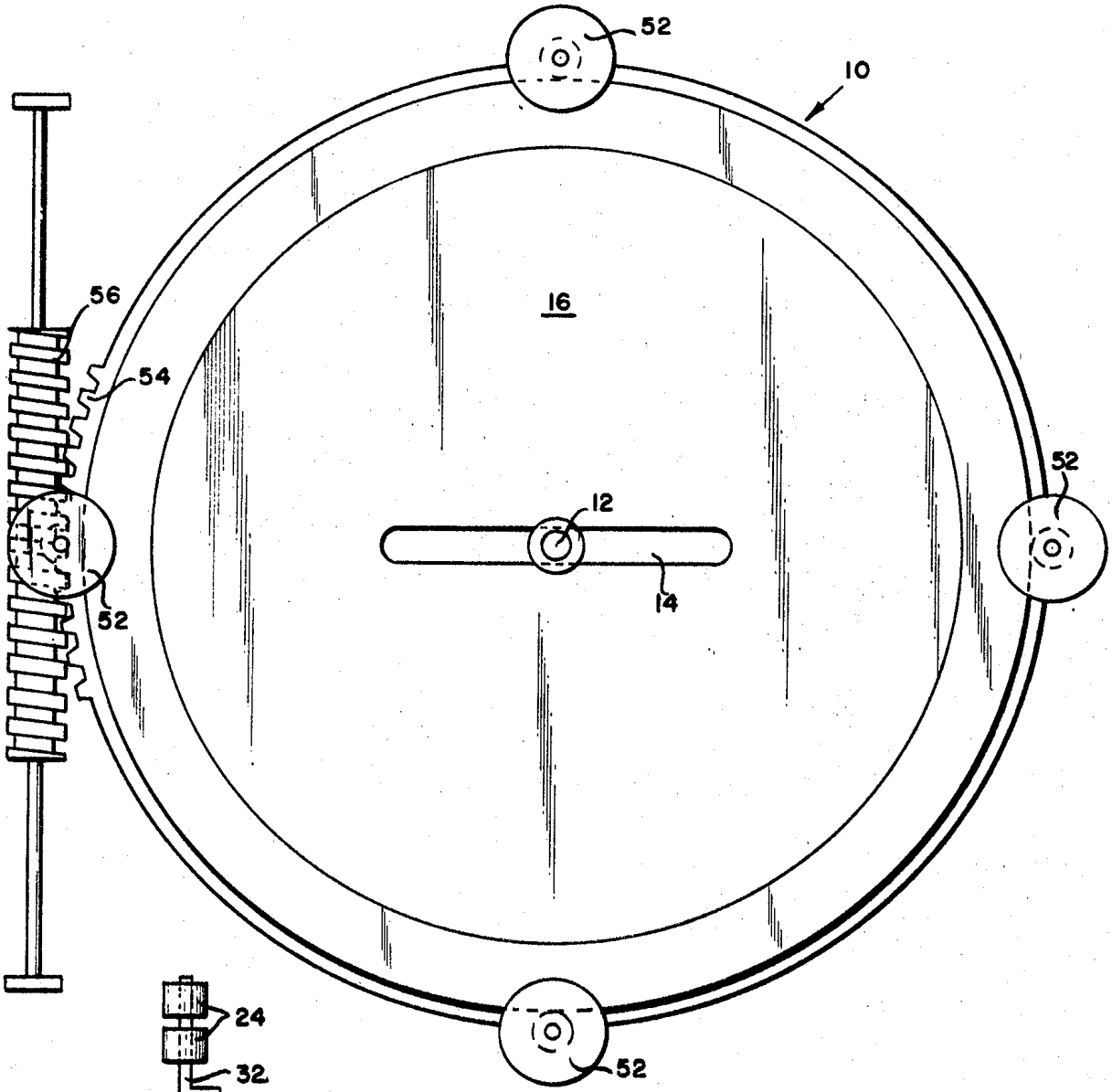
Fig. 4



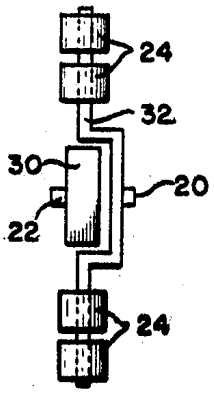


Fig. 5

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Fig. 6

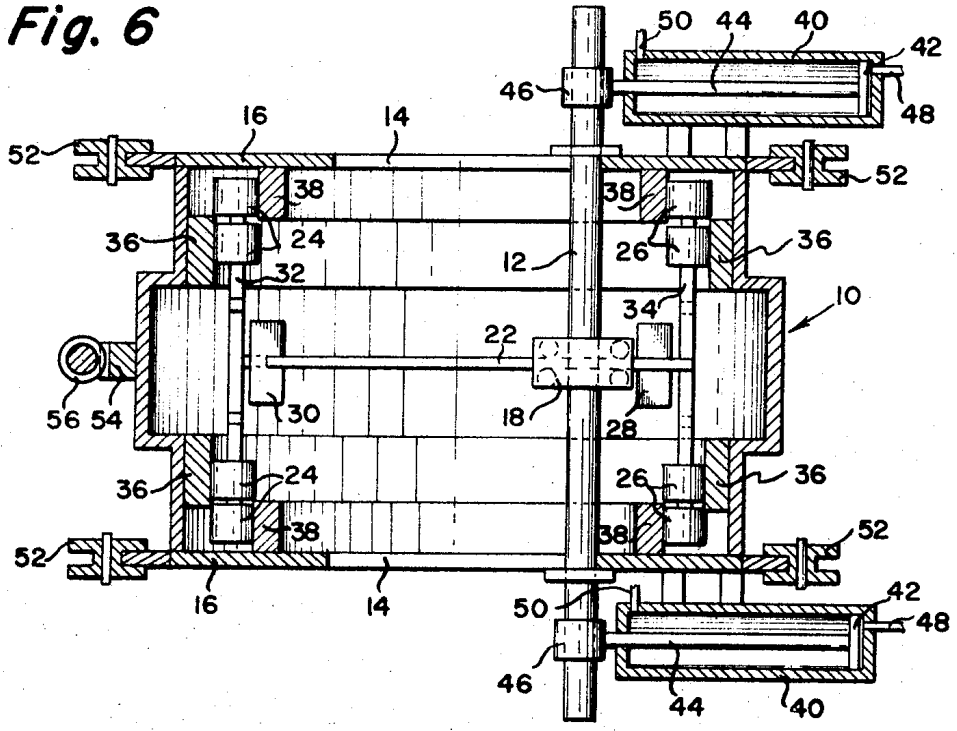
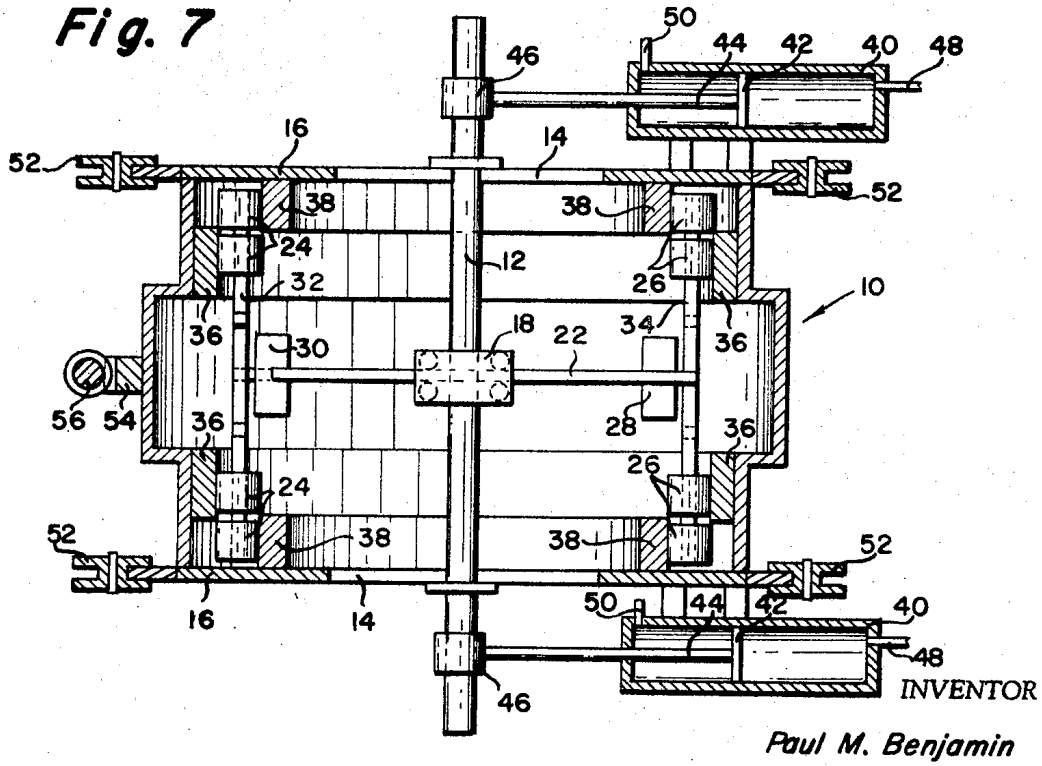


Fig. 7



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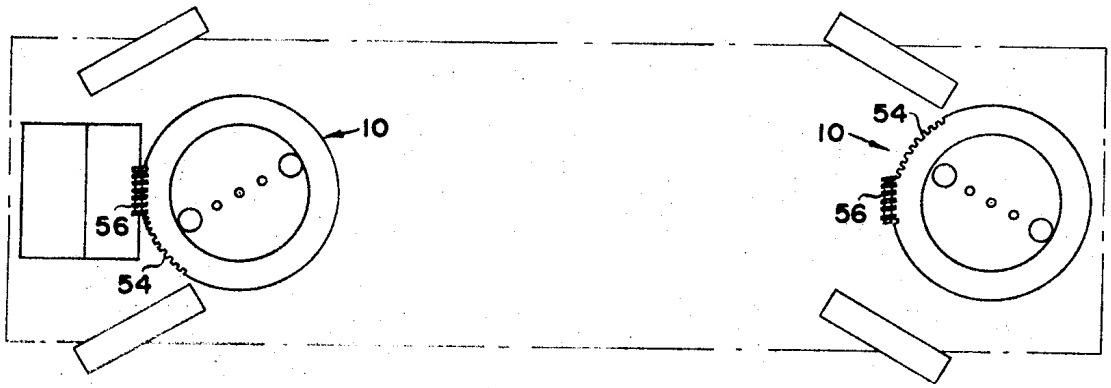

Fig. 8

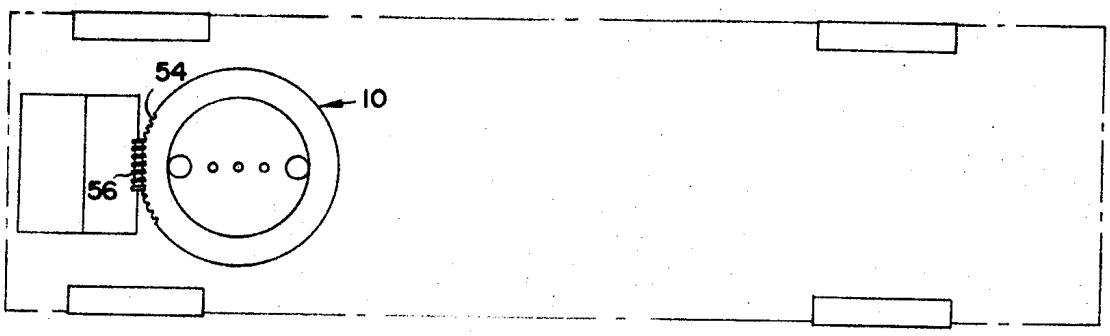

Fig. 9

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CENTRIFUGAL THRUST MOTOR

CROSS-REFERENCE TO RELATED APPLICATION

This application is a continuation in part of my co-pending application Ser. No. 836,815, filed June 26, 1969, now abandoned.

BACKGROUND OF THE INVENTION

This invention relates to a centrifugal thrust motor, and more particularly, to a motor whereby the energy of rotating masses is translated into a force in a direction transverse to the axis of the rotating weights. The force thus generated may be suitably controlled and used to propel a vehicle, or for other suitable purposes.

There have been many attempts to provide a satisfactory motor taking advantage of the fact that shifting weight exerts a force. The harnessing of this force has tended to be somewhat difficult. This invention provides a means for converting this rotational energy into translational energy, and in this manner, it provides a motor of economical construction and utility, and it overcomes several of the disadvantages of internal combustion engines. For example, there are a few moving parts, the fuel cost for the operation of the motor of this invention would be negligible, wear on the moving parts would be also very slight, and atmospheric pollution from the motor would be but a fraction of that caused by internal combustion engines.

Additionally, this invention has the advantage that the direction of force generated may be changed so that the force is exerted in the desired direction. This is of particular utility in a vehicle whereby the force generated could be exerted in the direction that the vehicle is turning.

It is therefore a primary object of this invention to provide a centrifugal thrust motor of simple yet reliable construction.

A further object of this invention is to provide a centrifugal thrust motor wherein a transverse force is generated by means of a plurality of rotating weights.

Still another object of this invention is to provide a centrifugal thrust motor wherein the direction of the force generated may be controlled and positioned in a beneficial manner.

Yet a further object of this invention is to provide a centrifugal thrust motor of relatively few moving parts.

Still another object of this invention is to provide a centrifugal thrust motor capable of generating a force in a reverse mode.

These and other objects and advantages of this invention will become more apparent to those skilled in the art as description proceeds when considered along with the accompanying drawings in which:

FIG. 1 is a top plan view of this invention in a neutral position;

FIG. 2 is a view similar to FIG. 1 showing the central shaft in a shifted position;

FIG. 3 is a view similar to FIG. 2 showing the shaft in a shifted position, and a different rotational position for the weights;

FIG. 4 is a top plan view of the motor of this invention with the upper cover in place;

FIG. 5 illustrates one of the weight members used in this invention;

FIG. 6 is a sectional view along lines 6—6 of FIG. 2 and viewed in the direction of the arrows;

FIG. 7 is a sectional view along lines 7—7 of FIG. 1 and viewed in the direction of the arrows;

FIG. 8 is a schematic view illustrating the application of two of the motors of this invention in a vehicle; and

FIG. 9 is a schematic view similar to that of FIG. 8, but showing only one of the motors of this invention as could be used in a vehicle.

DESCRIPTION OF THE INVENTION

Referring more particularly to FIG. 1, of the drawings, there is shown the motor of this invention generally designated 10. Mounted within the housing 10 for rotational movement and transverse shifting, is a shaft 12. The ends of the shaft 12 extend through elongate openings 14 in housing covers 16.

Rigidly secured to shaft 12 is a bracket 18 which supports arms 20 and 22 in such a manner that arms 20 and 22 may reciprocate within bracket 18. Mounted on arm 20 are a plurality of weights 24, and on arm 22 are a plurality of weights 26. On the other end of arm 20 is a weight 28, and on the other end of arm 22, is a weight 30. Weights 24 are supported for rotational movement on an axle 32 which is attached to arm 20, and weights 26 are likewise supported on axle 34. Weights 24 and 26 are substantially equal, and weights 28 and 30 are substantially equal.

Weights 24 and 26 are constrained to rotational and planetary movement only by means of members 36 and 38 which are integrally formed with the housing, and served to define a track 39 for weights 24 and 26.

As best seen in FIGS. 6 and 7, hydraulic cylinders 40 are provided. These cylinders are of ordinary construction and include pistons 42 and piston rods 44. The rods are connected to shaft 12 by means of coupling member 46. Shaft 12 is free to rotate within members 46. Ports 48 and 50 are porvided within cylinders 40 for admission of hydraulic fluid to either side of piston 42. The hydraulic fluid is supplied by any suitable source (not shown).

As best seen in FIGS. 6 and 7, the motor housing 10 is supported by means of journals 52 in such a manner that the housing may be rotated. A ring gear segment 54 is provided on the exterior of housing 10, and a worm gear 56 is in mesh with ring gear segment 54. Thus, rotation of worm gear 56 in a manner to be described later will cause rotation of housing 10.

Means (not shown) are provided for rotating shaft 12, and with it weights 24, 26, 28, and 30. Any suitable means such as a small internal combustion engine, electric motor or hydraulic motor may be used.

Although the invention thus far described has illustrated only two weight support arms, additional arms could be used with appropriate adjustments made to the invention described. Additionally, other weights could be added to arms 20 and 22.

OPERATION

The operation of this invention will be described with respect to FIGS. 1, 2 and 3. In FIG. 1, weight 24 is shown to have rotational working length 58, which is equal to working length 60 of weight 26. Weight 28 has a working length 62 which is also equal to working length 64 of weight 30. Therefore, since weights 24 and 26 are equal, and weights 28 and 30 are equal, the force moment defined by weight 24 and working length 58 plus the moment defined by weight 30 and working length 64 is equal to the force moment of weight 26 and

working length **60** plus the force moment of weight **28** and working length **62.** The motor is said to be in a neutral position when these forces are equal.

When fluid pressure is admitted through ports **50** of hydraulic cylinder **40,** pistons **42** are shifted to the right as seen in FIG. **6.** This corresponds to the shift in the shaft **12** as seen in FIG. **2** and **6.** Since the force generated by the rotating weights is a function of the mass of the weights, the working radius of the weights, and the angular velocity of the weights, and an imbalance of forces is set up in the mode of operation of FIG. **2.** This imbalance of forces results in a vibration of the motor, and obviously, the vehicle in which it is mounted. However, by utilizing a suitable one-way clutch mechanism on the vehicle, the reverse force of the motor is braked, while the forward force is permitted to exert itself through the motor and vehicle frame so as to propel the vehicle. Suitable clutches are, for example, those as shown in U.S. Pat. Nos. 1,094,756 or 978,966 or 1,067,707.

In this manner, continued rotation of the shaft **12** while in the position shown in FIG. **2** will result in an intermittant force in the direction of arrow **66.** As the rotational speed of shaft **12** increases, the intermittancy of the force will decrease and will tend to become a more uniform force. Also, by providing additional weights and corresponding arms, the force also would tend to become more uniform.

With reference to FIGS. **8** and **9,** the motor of this invention **10** is shown mounted within a suitable vehicle. The motor could be mounted in a stationary position as most conventional motors are mounted, however, in the preferred embodiment, housing support journals **52** are provided in order that motor **10** may be rotated. Worm gear **56** is connected by suitable linkage (not shown) to the steering mechanism of the vehicle. The connection is such that when the steering wheel is turned to turn the wheels of the vehicle to the left, for example, the motor **10** will also be turned to the left and the force generated by the motor will be in the direction in which the vehicle is aimed. FIG. **8** shows how an additional motor may be mounted in the rear of a vehicle with corresponding steering means for turning the rear wheels and the rear motor in the same direction. FIG. **9** is similar to FIG. **8,** but includes only one motor.

It is to be understood that this motor may be adaptable for other uses such as an agitator or vibrator and so adapted to be mounted on a frame suitable for such purposes.

While this invention has been described in connection with different embodiments thereof, it will be understood that it is capable of further modification, and this application is intended to cover any variations, uses, or adaptations of the invention following, in general, the principles of the invention and including such departures from the present disclosure as common within known or customary practice in the art to which the invention pertains, and as may be applied to the essential features hereinbefore set forth and as fall within the scope of the invention or the limits of the appended claims.

What I claim is:

1. A centrifugal thrust motor including:

a. a frame member having a continuous track portion,

b. a rotating, shiftable shaft within said track portion,

c. at least two weight support members, each having a working length,

d. means for connecting said weight support members to said shaft,

e. substantially equal weight means attached to one end of each of said weight support members, said weight means being in engagement with said track,

f. at least two of said weight means being on opposite sides of said shaft,

g. means for rotating said shaft,

h. means for shifting said shaft in a direction transverse to the axis of said shaft,

i. whereby when said shaft is rotating, upon shifting said shaft, the working length of at least one of said weight support members is greater than the other individual working lengths of the remainder of said weight support members in at least one point of the rotation of said weights.

2. A centrifugal thrust motor as in claim **1** and wherein:

a. said means for shifting said shaft includes hydraulic cylinders mounted on said frame member.

3. A centrifugal thrust motor as in claim **2** and wherein:

a. said means for rotating said shaft includes an electric motor.

4. A centrifugal thrust motor as in claim **3** and including:

a. second substantially equal weight means attached to the other ends of each of said weight supporting means.

5. A centrifugal thrust motor as in claim **4** and including:

a. means rotatably supporting said frame member, and

b. means for rotating said frame member.

6. A centrifugal thrust motor as in claim **5** and wherein:

a. said means for rotating said frame member includes gear means on said frame member, and

b. a worm gear engaging said gear means.

7. A centrifugal thrust motor as in claim **6** and wherein:

a. said frame member includes a substantially cylindrical housing.

8. A centrifugal thrust motor as in claim **7** and wherein:

a. said means for connecting said weight support means to said shaft includes a bracket for slidably receiving said weight support means.

9. A centrifugal thrust motor as in claim **7** and including:

a. means for attaching said housing to the chassis of a vehicle.

10. A centrifugal thrust motor as in claim **9** and wherein:

a. said worm gear is connected to the steering mechanism of said vehicle,

b. whereby upon operating said steering mechanism, said motor is rotated so that the direction of thrust of said motor is the same as the desired direction of said vehicle.

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