

N^o 27,948



A.D. 1909

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Complete Specification Left, 9th Mar., 1910—Accepted, 18th Aug., 1910

PROVISIONAL SPECIFICATION.

Improved Means for Converting Reciprocating into Rotary Motion.

I, FREDERICK LAMPLOUGH, of Albany Works, Cumberland Park, Willesden Junction, in the County of Middlesex, Managing Director, do hereby declare the nature of this invention to be as follows:—

5 The invention relates to improved means to be employed in substitution for a crank for obtaining rotary motion of a shaft.

Amongst the attempts made to obtain the rotary motion of a shaft without the use of cranks thereon it has been proposed to fix on the shaft to be rotated a disc which is set at an angle thereto and to press a rotatable wheel or ball against the disc so as to follow it up both backward and forward thus producing rotary motion of the shaft.

10 Many attempts have been made to utilise this method of obtaining rotary motion but they have all failed owing to the excessive vibration set up by the direct attachment of the necessary prime moving rods or levers to the part pressing against the angularly set disc fixed on the shaft to be rotated. The vibration is caused by the eccentricity of the rim of the angularly set disc which travels to and fro in a path having the form of the figure 8 owing to its having a combined circular and oscillatory motion.

15 Around the angularly set disc I mount a ring or bearing which by being pressed to and fro in a direction parallel with the shaft gives rotary motion thereto.

20 By experiment I have found that at two points of the periphery of the said ring or bearing it can be made to travel in a reciprocating curved line approximating an arc proportionate to the amount of angularity of the disc.

This line is only what might be known as a centre line as the effect radially is a slight oscillation.

25 These two points are situated on a right line passing through the axis of the shaft to be driven and for my purpose I utilise these two points and mount upon the aforesaid ring or bearing at such parts a pair of trunnions which I will hereinafter refer to as E and W. These trunnions are mounted in bearings forming part of a yoke within an opening in which the angularly set disc can freely rotate within its surrounding ring or bearing and such yoke is provided with trunnions working in suitable fixed bearings and placed at right angles to the trunnions E and W on the ring or bearing and which I will refer to as N and S. By suspending the angularly set disc in this manner the points or trunnions E and W are free to travel in their arc and at the same time oscillate. The bearings in which the trunnions E and W are supported have no oscillation whatever, but simply travel in an arc as the other trunnions N and S are oscillated. By the above means an erratic motion is harnessed into a true mechanical motion as by means of suitable levers attached to the N and S trunnions or to either of them the E and W trunnions can be oscillated and a rotary effect transmitted to the shaft on which the angularly set disc is fixed.

40 I also provide means for balancing such a motion. For this purpose I fix upon the shaft to be rotated a pair of these angularly set discs which are set

[Price 8d.]



Improved Means for Converting Reciprocating into Rotary Motion.

at reversed angles upon the shaft and each of these discs is provided with the mechanism above described.

In this case the two yokes at E and W will travel out together on one side and in together on the other side whereby each will absorb the other's thrust.

The various trunnions and their bearings are preferably fitted with ball bearings. 5

The outer bearing or ring surrounding the angularly set disc is also fitted with ball bearings preferably arranged in the following manner:—

Two rows of balls are employed; the outer bearing or ring has on the sides of its inner periphery two races for said balls and the solid portion of the angularly set disc has a ball race for one of these rows of balls whilst an adjustable ring screwing on to said solid portion has a ball race for the second row of balls. A conical locking ring fitting a conical recess in the adjustable ball bearing ring is fixed, by lugs and bolts, or screw studs and nuts and lock nuts so as to bind the threads of the adjustable ring against the threads of the solid part of the angularly set disc. The adjustable and locking rings are formed with interfitting projections and recesses to prevent any possibility of rotation of the adjustable ring. 10 15

Dated this 30th day of November, 1909.

HARRIS & MILLS, 20
23, Southampton Buildings, London, W.C., and at
Sheffield and Llanely,
Agents.

COMPLETE SPECIFICATION.

Improved Means for Converting Reciprocating into Rotary Motion. 25

I, FREDERICK LAMPLUGH, of Albany Works, Cumberland Park, Willesden Junction, in the County of Middlesex, Managing Director, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:— 30

The invention relates to that type of apparatus in which a shaft has an inclined disc fixed thereon which is surrounded by a ball bearing ring provided with trunnions which are mounted in bearings in a frame or yoke, this yoke being carried by other trunnions at right angles to the first mentioned trunnions. In such apparatus the yoke has connecting rods attached thereto. If the connecting rods be reciprocated the yoke will be oscillated and the shaft carrying the inclined disc will be rotated. If the shaft be rotated the yoke will be oscillated and the connecting rods will be reciprocated. 35

The present invention consists in the combination and arrangement of parts herein shown and described whereby the apparatus is improved and the ball bearing ring is rendered capable of being readily adjusted. 40

I will describe my invention by the aid of the accompanying drawings in which:—

Figure 1 is a face view of the apparatus many of the parts being shown in section and 45

Figure 2 is a sectional side view of parts thereof.

In both figures like parts are indicated by similar letters and figures of reference.

a is the shaft to which rotary motion is to be given. *b* is an angularly set disc fixed on the shaft *a*. Around the periphery of the disc *b* I mount a ring 50

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or bearing *c* between which and the disc *b* suitable anti-friction devices are arranged. This ring or bearing *c* is mounted in a yoke *e* which is oscillated by a prime mover about an axis at right angles to and passing through the axis of the shaft *a*, the angle of oscillation of this yoke being the same as
5 the angle subtended by any point upon the ring during one half rotation of the shaft.

The power transmitted to the oscillating yoke is applied to the angularly set disc *b*.

10 Trunnions *d* are mounted in bearings *e*¹ forming part of the yoke *e* within which the angularly set disc *b* can freely rotate and such yoke is provided with trunnions *e*² working in suitable fixed bearings *f* and placed at right angles to the trunnions *d* on the ring or bearing *c*.

By this construction the trunnions *d* are free to travel in the circular path struck from the axis of oscillation of the oscillating yoke and at the same time
15 to oscillate on their own axes. The bearings *e*¹ in which the trunnions *d* are supported have no oscillation whatever but simply travel in arcs as the other trunnions *e*² are oscillated. By means of suitable levers *g* attached to or forming part with one or both of the trunnions *e*² the trunnions *d* can be oscillated and a rotary motion transmitted to the shaft *a* on which the angularly
20 set disc *b* is fixed.

I also provide means for balancing such a motion. For this purpose I fix upon the shaft *a* to be rotated a pair of these angularly set discs *b* which are set at reversed angles upon the shaft *a* and each of these discs *b* is provided with the mechanism above described.

25 In this case the bearings *e*¹ of the two yokes *e* will be operated by means causing them to travel out together or away from each other on one side and in together or towards each other on the other side whereby each will absorb the other's thrust.

The various trunnions and their bearings are preferably fitted with ball
30 bearings as shown.

The disc *b* and the ring or bearing *c* are fitted with ball bearings arranged in the following manner:—

Two rows of balls *h* are employed as heretofore. According to the present invention the ring or bearing *c* has at the sides of its inner periphery two
35 races *i* for said balls and the angularly set disc *b* has a ball race *b*¹ for one of these rows of balls *h* whilst an adjustable ring *b*² screwing on to the disc *b* has a ball race *b*³ for the second row of balls *h*.

A conical locking ring *k* fitting a conical recess in the adjustable ring *b*² is fixed by lugs *b*⁴ and bolts, or screw studs *b*⁵ and nuts *b*⁶ so as to bind the
40 threads of the adjustable ring *b*² against the threads of the disc *b*. The adjustable ring *b*² and the locking ring *k* are formed with interfitting projections and recesses to prevent any possibility of rotation of the ring *b*².

When it is desired to adjust the ring *b*² the nuts *b*⁶ are unscrewed sufficiently to allow the locking ring *k* to be withdrawn from the ring *b*² so that the inter-
45 fitting parts do not prevent the locking ring *b*² being rotated. When this latter has been adjusted it is left in such a position that the interfitting parts on the ring *k* will engage with the interfitting parts on the ring *b*². The locking ring *k* is then caused to engage with the ring *b*² and the nuts *b*⁶ are tightened.

50 Reciprocating motion is given to the levers *g* by means of links *l* operated by a prime mover in any suitable manner.

It will be understood that if the shaft *a* be rotated it will give reciprocating motion to the links *l*.

Having now particularly described and ascertained the nature of my said
55 invention and in what manner the same is to be performed, I declare that what I claim is:—

1. The improved apparatus for converting reciprocating into rotary motion

Improved Means for Converting Reciprocating into Rotary Motion.

or rotary motion into reciprocating motion, in which an inclined disc is fixed on a shaft and is surrounded by a ring having two ball races, the said ring having trunnions carried by a yoke mounted on other trunnions, characterised by the inclined disc having one ball race and an adjustable ring which screws into the said disc having another ball race, a conical locking ring fitting a conical recess in the adjustable ring, interfitting parts on the adjustable ring and the locking ring and nuts for tightening the locking ring, substantially as herein shown and described. 5

2. The improved apparatus for converting reciprocating motion into rotary motion or rotary motion into reciprocating motion herein shown and described. 10

Dated this 8th day of March, 1910.

HARRIS & MILLS,
Agents.

SHEET 1

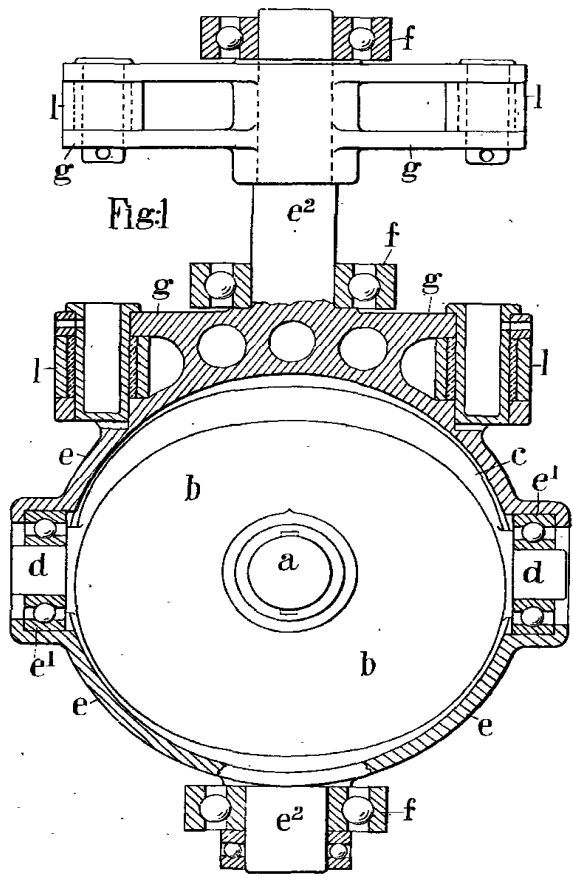


Fig:1

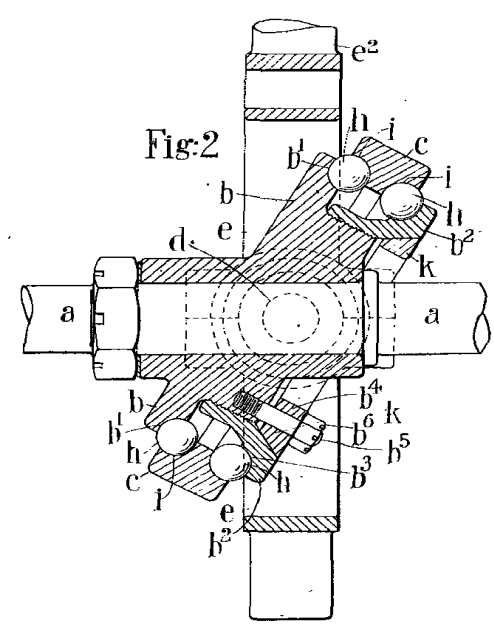
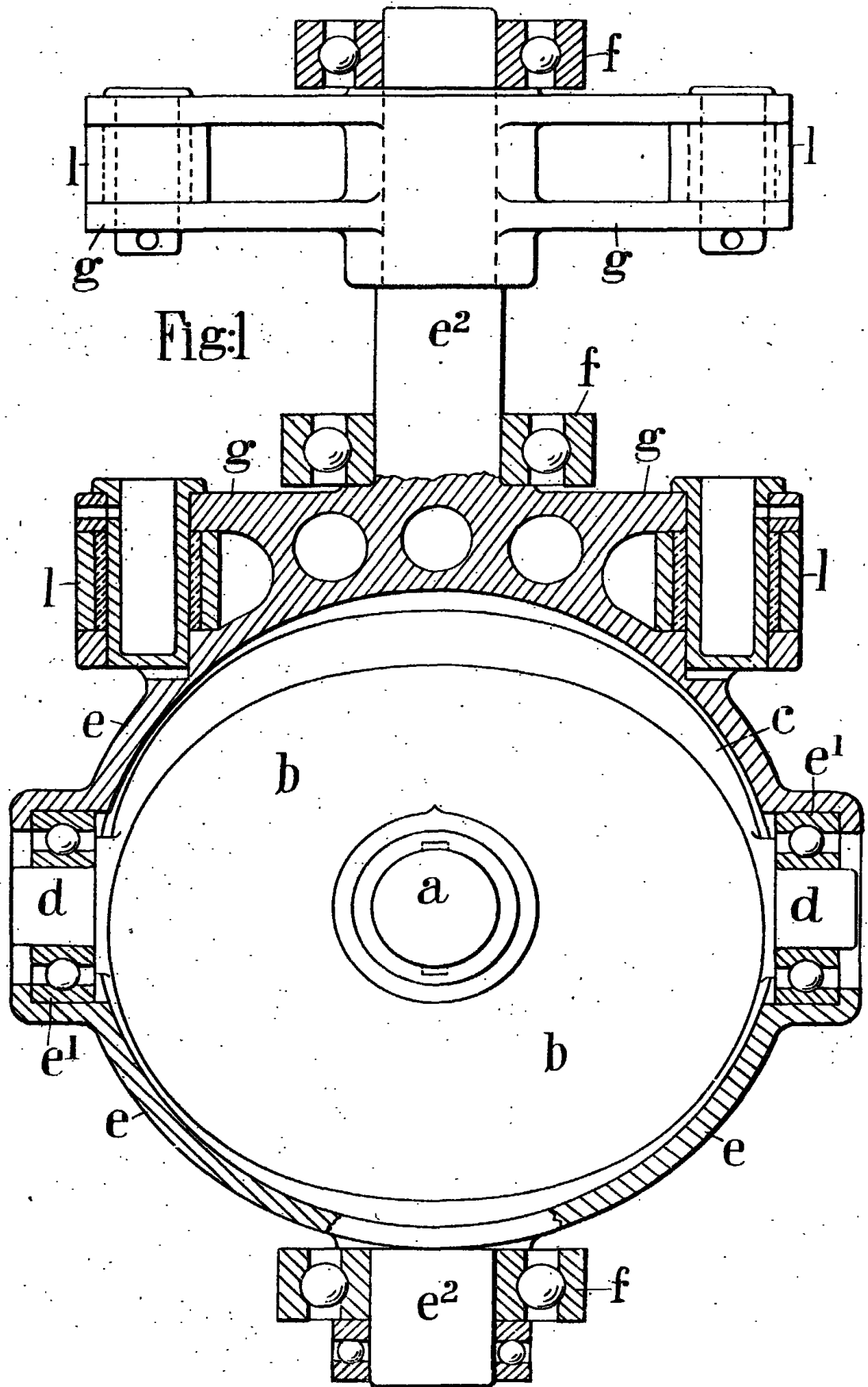


Fig:2

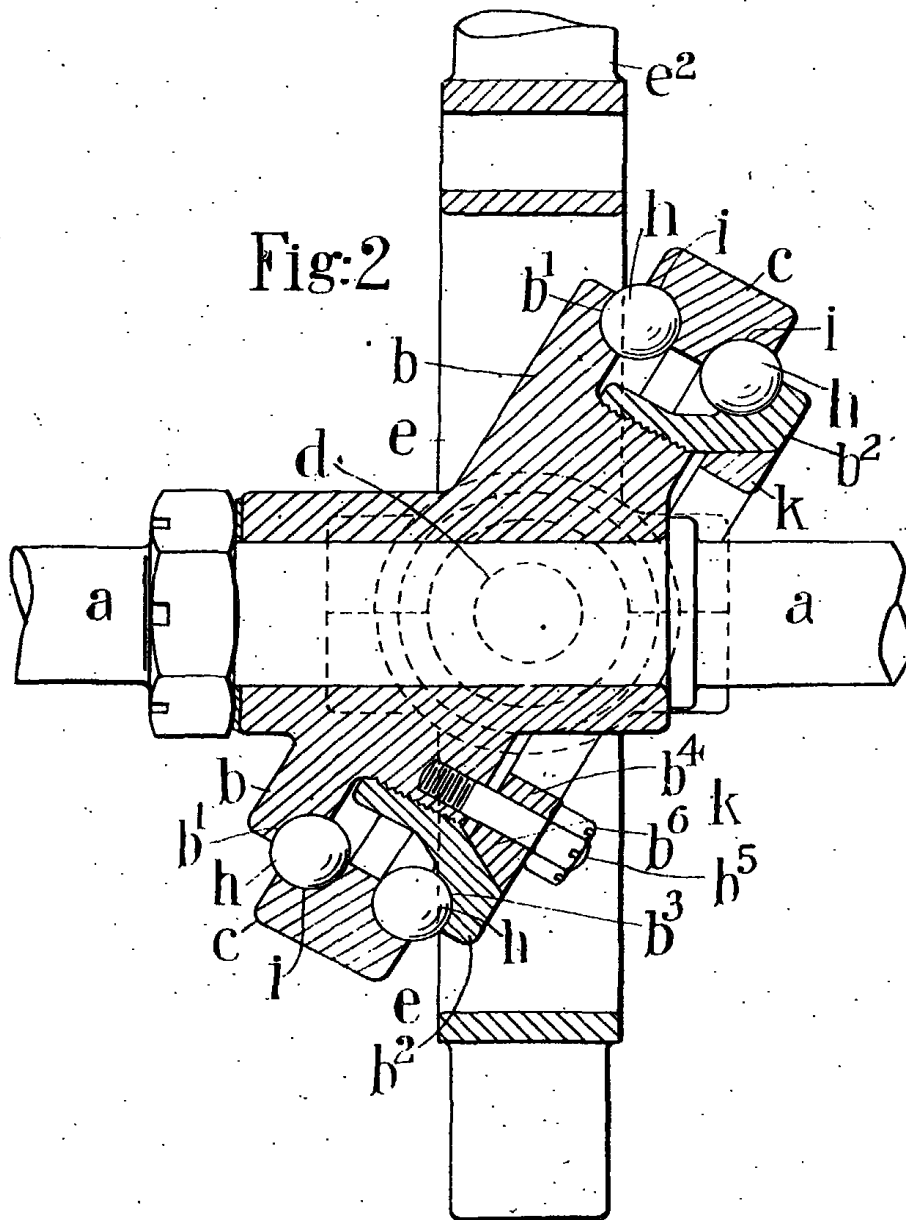
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