N° 23,277 A.D. 1913

Date of Application, 15th Oct., 1913

Complete Specification Left, 11th Apr., 1914—Accepted, 16th July, 1914

PROVISIONAL SPECIFICATION.

A Magnetic Motor.

I, Ernest William Fuller, of 32, East Street, Lindley, Huddersfield, in the County of York, Chauffeur, do hereby declare the nature of this invention to be as follows:—

The subject of this invention is the use and arrangement of permanent magnets to give a rotary motion.

The object to utilize the magnetic power of permanent magnets for motive purposes.

And comprises two sets of permanent magnets hereinafter named respectively "armature" magnets and "attracting" magnets. Each set of magnets arranged to a circle. "Armature" magnets bent to that circle and are a segment of that circle and hinged or pivoted in such manner that they are free to move from and to that circle. A ratchet device in connection with "armature" magnets and a free shaft. Connected to said shaft "attracting" magnets are fixed that draw or attract "armature" magnets towards them thereby causing the shaft to rotate through the ratchet device.

"Attracting" magnets so spaced that, with a connecting attachment between any two "armature" magnets the action of any "armature" magnet being attracted will cause its connecting magnet to be drawn back ready to be attracted in its turn, and suitable means for regulating the motor.

Dated the 14th day of October, 1913.

ERNEST WILLIAM FULLER.

COMPLETE SPECIFICATION.

A Magnetic Motor.

I, Ernest William Fuller, of 32, East Street, Lindley, Huddersfield, in the County of York, Chauffeur, 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:—

The subject of this invention is a self-driving apparatus in which permanent magnets are employed to produce rotary motion. The said apparatus comprises two sets of magnets, or one set of permanent magnets and one set of pieces of magnetic material, the two sets being arranged in concentric circles and one set being capable of rotation. The rotation of this set being started, either spontaneously on being brought opposite the other set, or by means of a slight push or swing given to a suitable rotary part of the apparatus by hand or other

[*Price* 8*d*.]

means, the mutual action of the two sets causes vibrations of the non-rotary set, which vibrations are transmitted to a shaft by means of a ratchet wheel or equivalent mechanical device. This shaft, in addition to maintaining or increasing the speed of rotation of the rotary set, constitutes a source of power, which may be taken from a crank or belt pulley thereon. Provided that the power demanded from the apparatus is not in excess of its capacity, the apparatus when once started will run without further attention until some essential part thereof wears out, but can be immediately stopped when desired by moving one set of magnets or pieces of magnetic material out of line with the other set, that is, by separating the two sets to a distance greater than that at which the attraction in the magnetic field is effective.

I will first describe an example in which two sets of permanent steel magnets are employed, the outer set being capable of collective rotation. Each magnet of the inner set (which I call "armature magnets") is pivoted on a fixed pin and mechanically connected to a pawl acting on a ratchet wheel. The magnets of the outer set are carried from a sliding boss on the shaft of the ratchet wheel, the sliding boss serving to bring these magnets into line with the armature magnets for starting the motor.

Fig. 1 is a plan of such portions of the device as are necessary for explaining the operation thereof, and Fig. 2 is a vertical section taken on the line II—II in Fig. 1.

The reference numeral 1 indicates a base plate; in a footstep bearing on this base plate runs a vertical shaft 2. A sleeve or boss 3 is operatively connected to this shaft, and its key 4 can slide in a long key-way on the shaft. The boss 3 can be engaged by the jaws of a suitable lever (not shewn) whereby this boss can be set in either of two positions, namely, a higher and a lower position. Secured to this boss is a flat disc or plate 5 carrying at its periphery a number of steel horse-shoe permanent magnets, say five, spaced out at equal circumferential distances from one another, and set radially or with their poles towards the centre, one pole above the other. These magnets, which form the outer magnetic ring, can of course be carried on spokes instead of on a disc if preferred; two of those shewn in the drawings are indicated by the reference numerals 6 and 7 respectively.

Surrounding the base plate 1 is a wall 8 (or a number of uprights) from which project horizontal arms 9, from each of which arms depends a "downcome" or hanging bracket 10. Each bracket 10 comprises bearings for a pawl lever 11 and an armature lever 12, the armature lever being operatively connected by a link 13 to the pawl lever in the next bracket 10 counter-clockwise. On the armature bracket is mounted a steel permanent horse-shoe magnet bent to form the arc of a circle, its poles being arranged opposite to those of the outer set of magnets 6, 7. Where five revolving magnets are employed in the outer circle, eight "armature" magnets may be employed in the inner circle, those shewn in the drawings being numbered 14^a, 14^b, *etc.* The individual magnets of both circles, thirteen in number in this example, are preferably all of about the same magnetic strength; they may all be reinforced as may be found necessary. The respective numbers five and eight are merely given as examples of an arrangement which avoids the occurrence of a "dead centre" or inoperative phase in their movement.

Surrounding the shaft 2 are four rings 15, each linked by two rods 16 to two opposite armature levers; one ring only is shewn in the drawings for the sake of clearness. These armature levers are pivoted in ball bearings in the brackets 10, and can vibrate so that the magnets which they carry either coincide with the large circle around which move the poles of the outer magnets 6, 7, *etc.*, or enter this circle so as to lie spirally, their inward movement being limited by adjustable screw stops 17 adapted to engage wearing contacts 18 on the ends of the armature levers.

A ratchet wheel 19 keyed on the shaft 2 is adapted to be operated by pawls 20

on all the eight pawl levers 11, for transmitting the impulse of rotation to the said shaft 2.

The boss 3 being lifted into the position shewn in Fig. 2, assuming the outer magnet 6 to be in the position shewn in Fig. 1, this magnet's pole N will attract and be attracted by the pole S of the magnet 14^a, whilst the attraction between the said magnet 6 and the bent over or equatorial part of the magnet 14^b will be very small. The magnet 6 will therefore tend to move slightly in the direction of the arrow 21; and as at least three of the other magnets in the outer circle will simultaneously tend to move in the same direction, the shaft 2 will usually begin to rotate clock-wise. At the same time, the magnet 14^a will swing centrifugally about its pivot at 22, and its lever 12 will, through rods 16, draw inwardly the lever 12 of the magnet 14^c to the extent permitted by the stop 17 in the bracket at the right hand side of the drawing, the play of the ring 15 about the shaft 2 being sufficient to permit of this movement. The lever 12 of the magnet 14^a also causes its pawl 20 to actuate the ratchet wheel 19 and convey a positive rotary motion to the shaft 2.

Each outer magnet in this way passes along one of the armature magnets, first attracting its poles outward and then passing to its equatorial or neutral end, when the pole end of the said armature magnet is drawn inward by reason of the centrifugal action of the armature magnet diametrically opposite; thus each armature magnet after its operative stroke is returned to the starting point, ready to begin the next stroke.

The ratchet wheel 19 is so geared that the period of outward vibration of an armature magnet is equal to the period of travel of an outer magnet from the pole end to the pivot of the armature magnet. The distance between the neutral end of one armature magnet and the pole end of the next should not exceed that over which the magnetic force can act with sufficient strength to cause the outer magnet to leave the said neutral end and approach the said pole end.

As before mentioned instead of both sets of magnets being permanent, either the armature magnets may be permanent, and the outer rotary set may be of soft iron and dependent for attraction upon the armature magnets, or the rotary set of permanent magnets may occupy the inner circle, and the armature of soft iron in the outer circle may be energized by the passage of the rotary set. In either of these arrangements, the armature magnets should be disposed with both upper and lower limbs radial in relation to the circle which they occupy, and with their poles towards the rotary magnets, and they should be mounted in such a manner as to be capable of a radial "in and out", or alternately centripetal and centrifugal movement in relation to the central shaft, this reciprocatory movement or vibration being transmitted to pawls and the central ratchet wheel by connections differing only in design from those already illustrated.

All material in contact with or in close proximity to the magnets must of course be non-magnetic, such as brass.

I am aware that it has previously been proposed for somewhat similar purposes to employ in combination a rotary set and a vibratory set of magnets or co-acting magnetic devices arranged in concentric circles, the movements of the vibratory set being produced by mechanical means, and the rotary set acting directly on the shaft; but it is a characteristic feature of my invention that the vibratory set of magnetic devices must drive the shaft.

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

1. A self-driving magnetic motor in which permanent magnets are employed to produce rotary motion, comprising a rotary set and a vibratory set of magnets or co-acting magnetic devices arranged in concentric circles, the former set in its rotation producing vibrations consecutively by magnetic means in the units

of the latter set, and means for transmitting such vibrations to a shaft in such manner as to produce a continuous rotation thereof.

2. A magnetic motor according to Claim 1 and substantially as described with reference to the accompanying drawings.

Dated this 9th day of April, 1914.

TASKER & CROSSLEY,
Patent Agents,
Halifax & Huddersfield.

Redhill: Printed for His Majesty's Stationery Office, by Love & Malcomson, Ltd.—1914.

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FULLER'S Complete Specification.

(2 SHEETS)
SHEET 1.

[This Drawing is a reproduction of the Original on a reduced scale.]

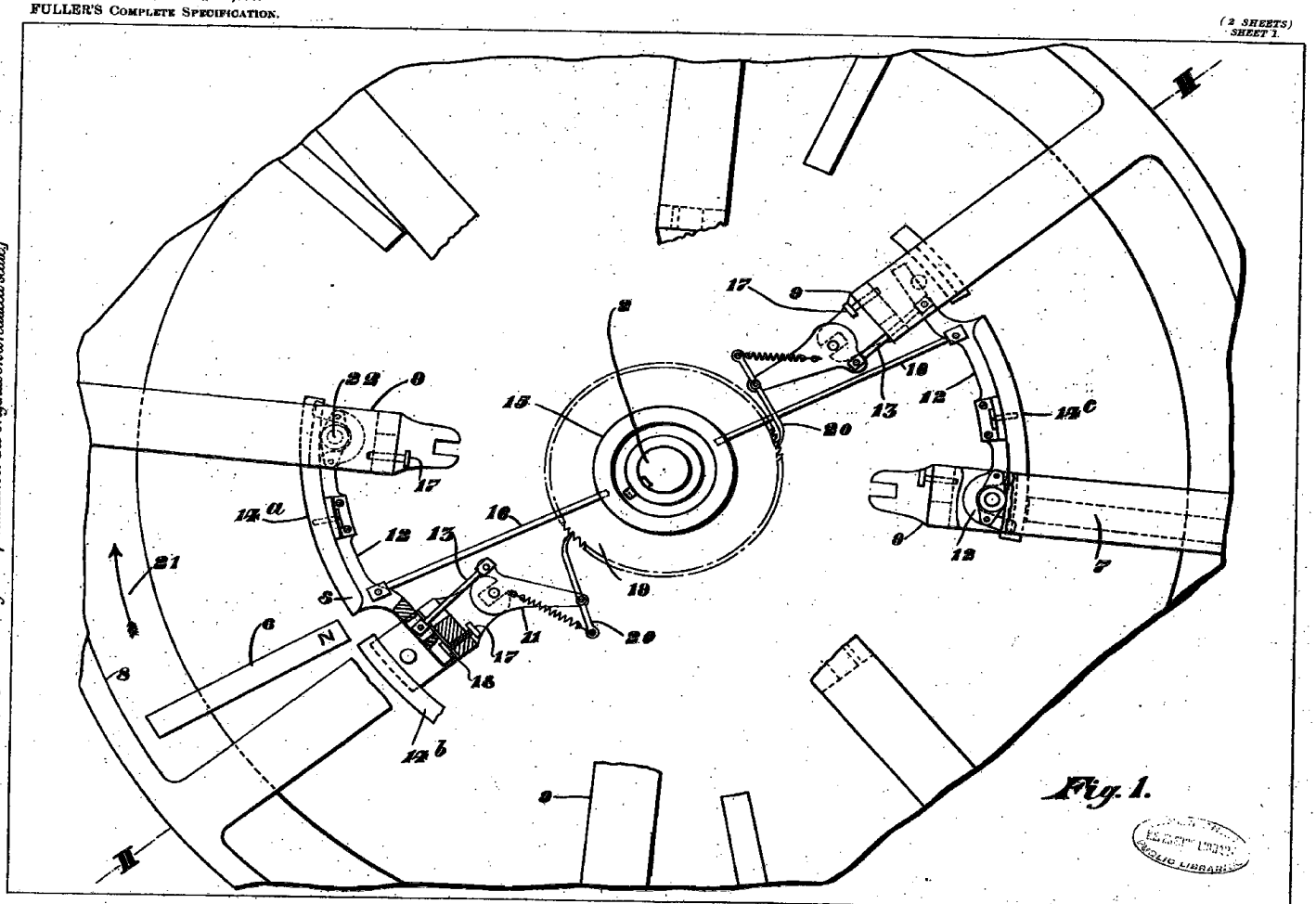
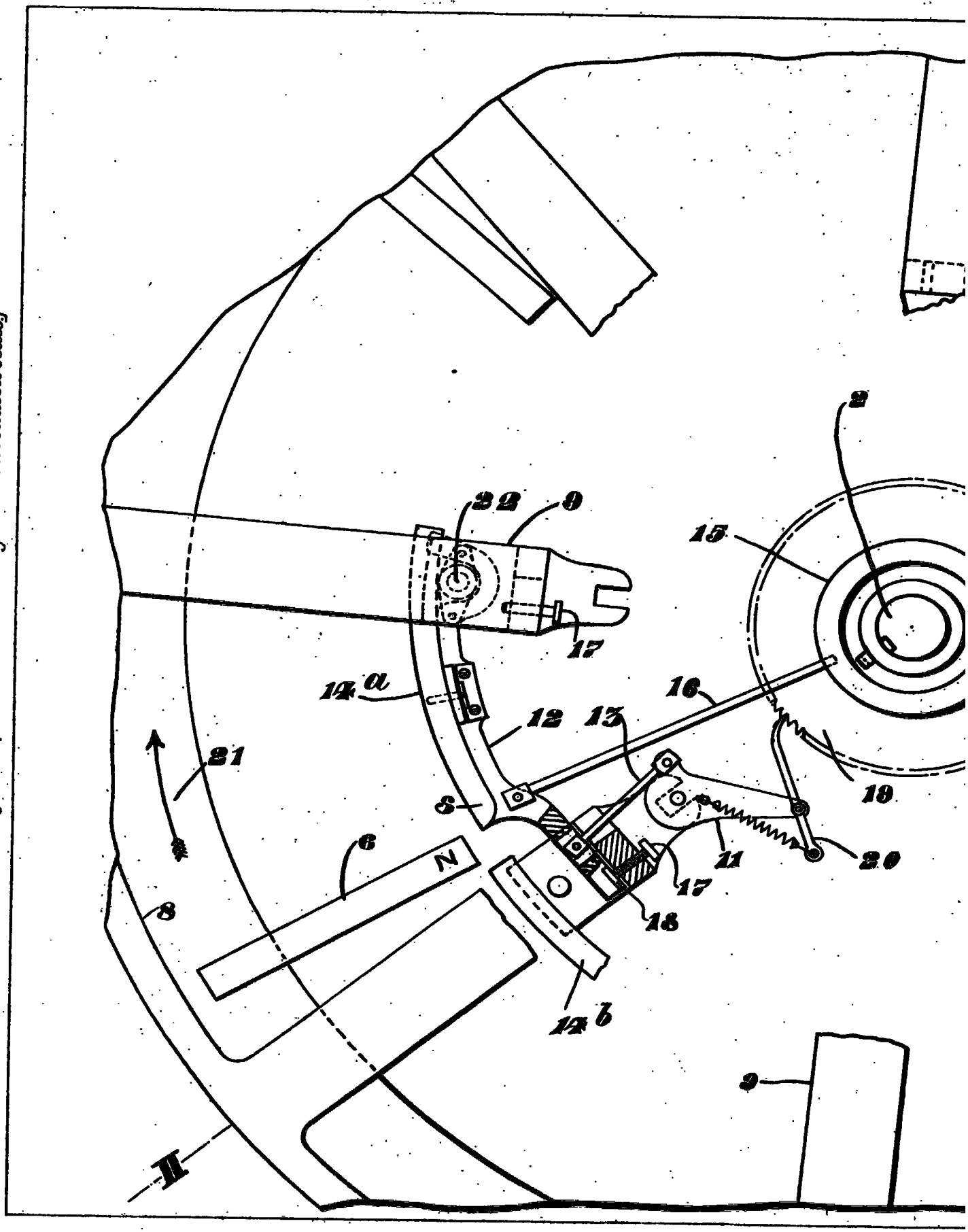


Fig. 1.



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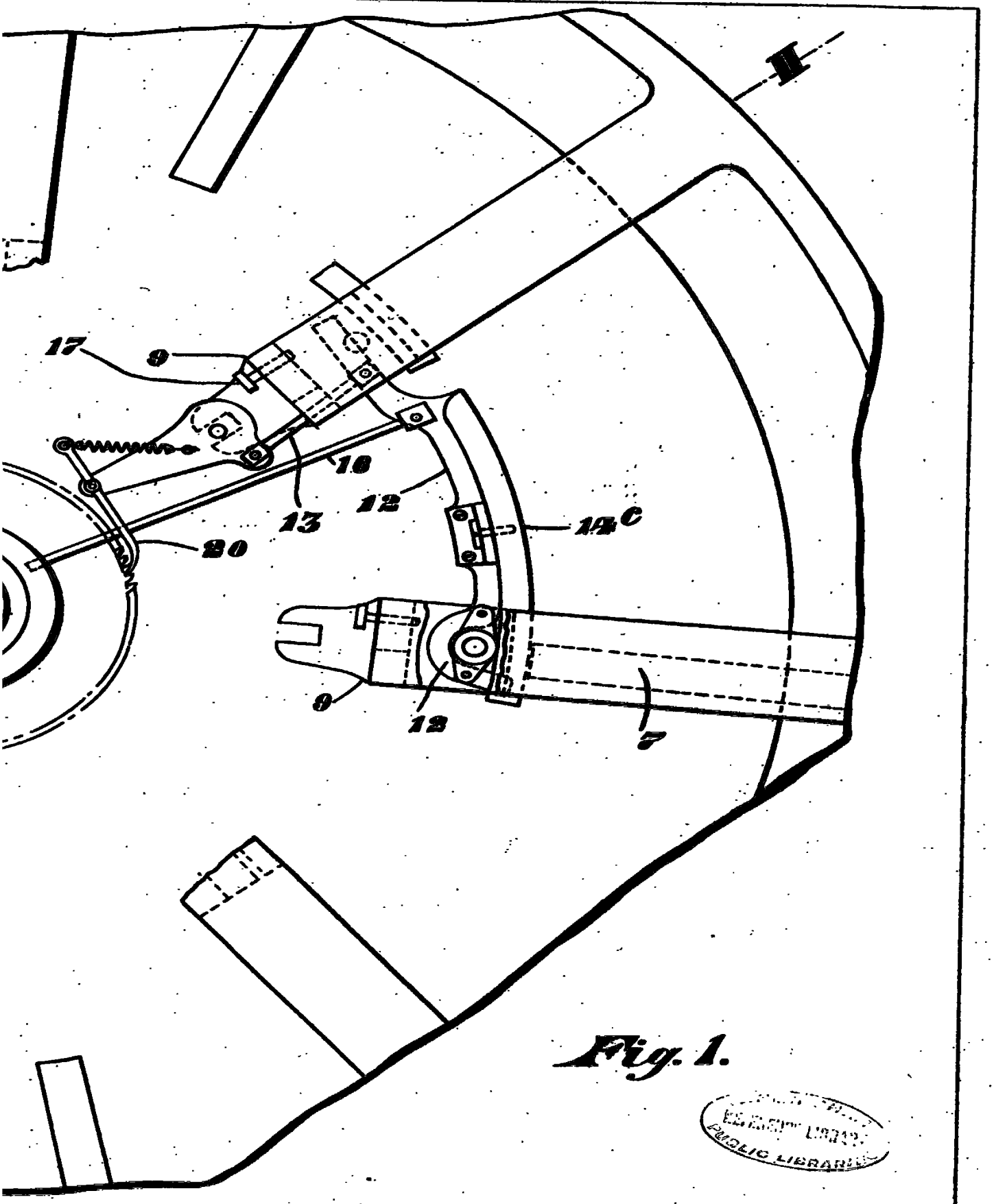

Fig. 1.

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A.D. 1913. Oct. 15. № 23,277.
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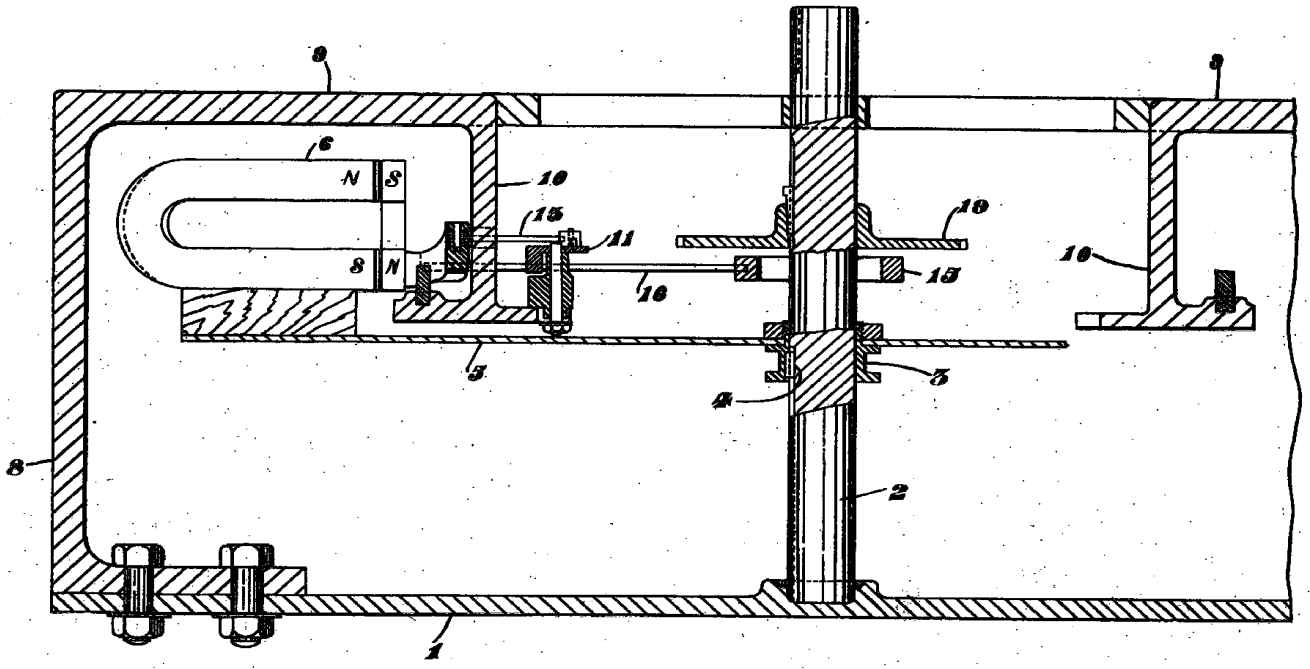

Fig. 2.

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[This Drawing is a reproduction of the Original on a reduced scale.]

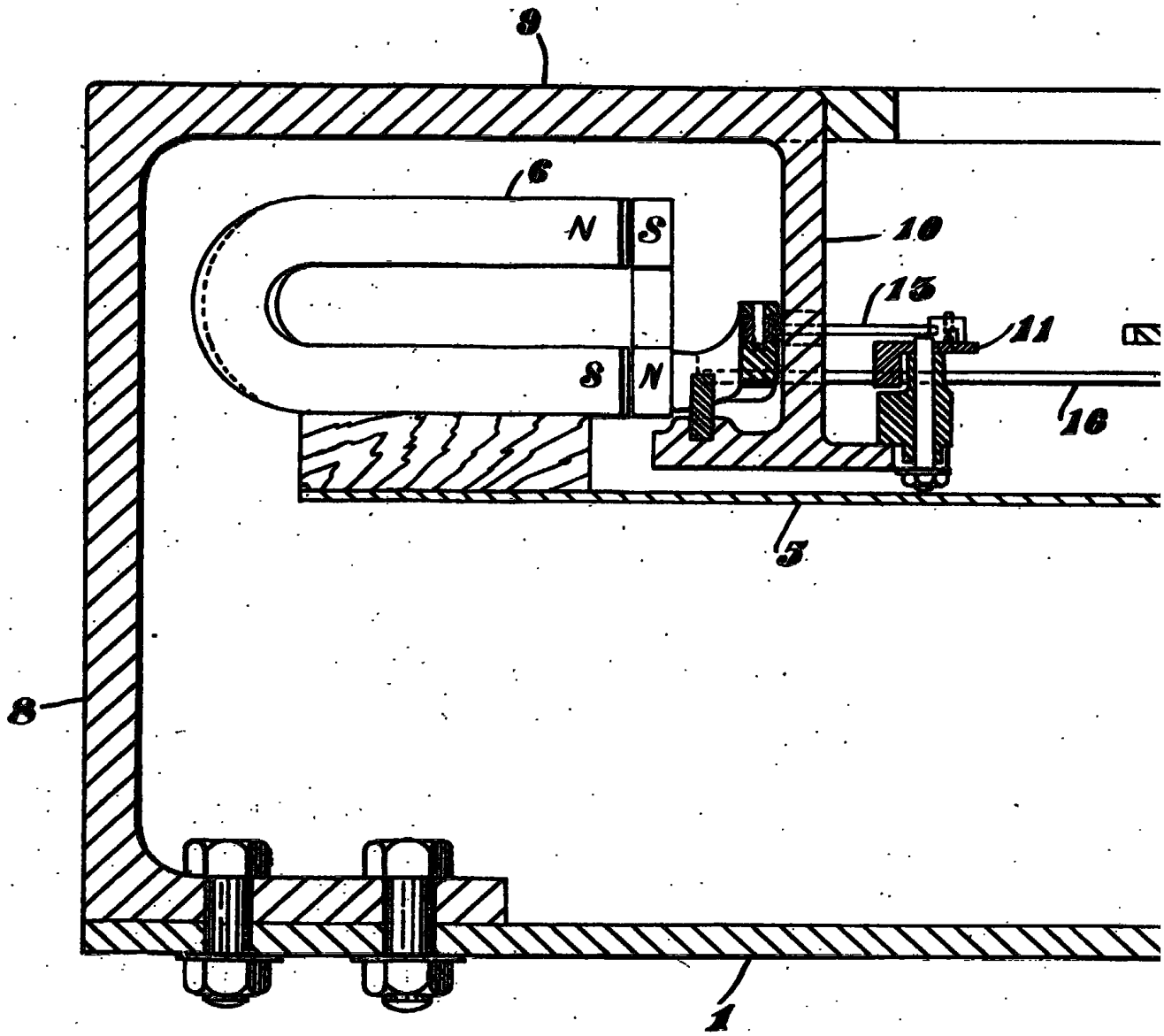
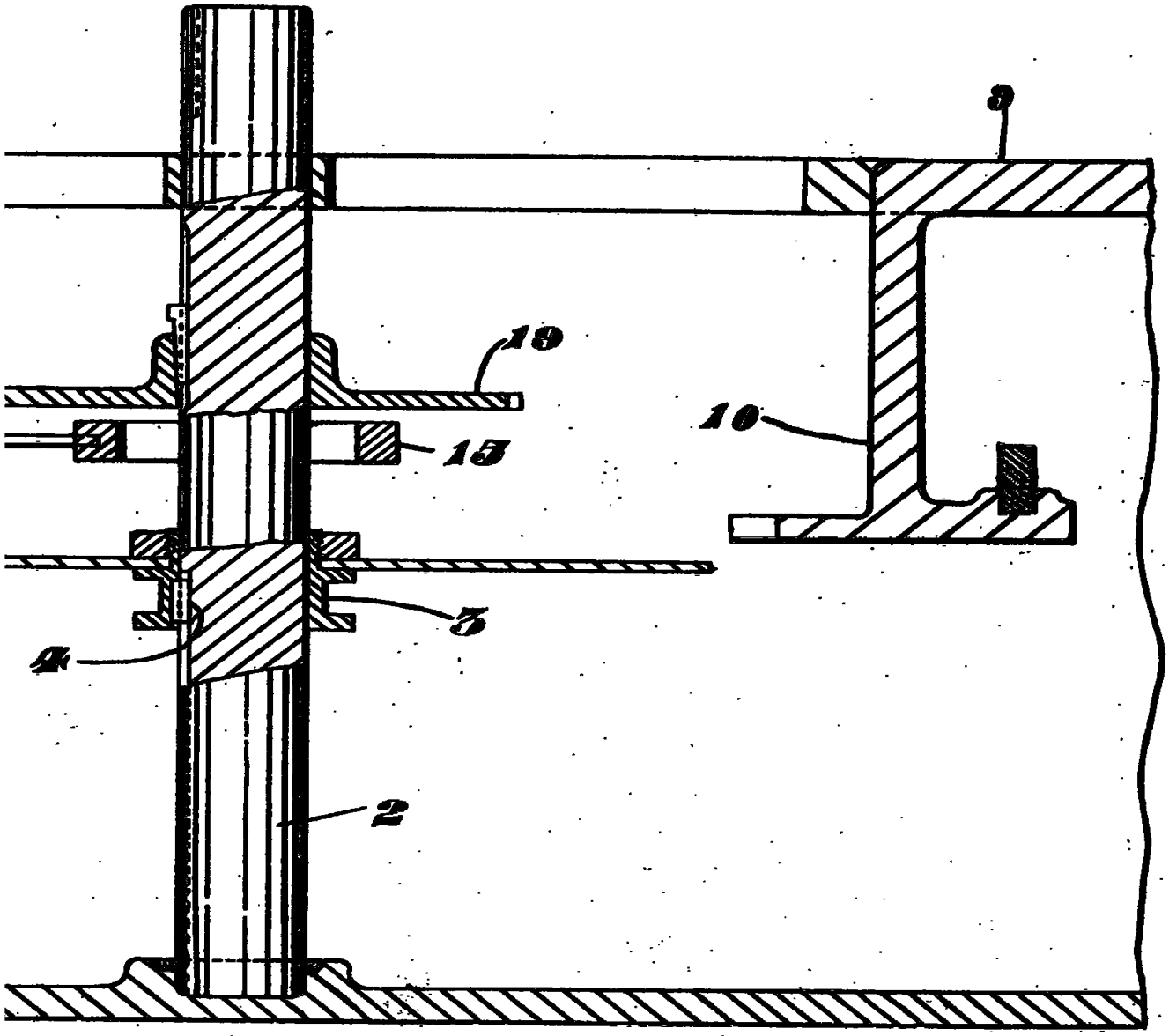


Fig. 2.



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