July 21, 1936. R. P. LANSING 2,048,075

ENGINE STARTING MECHANISM

Filed Feb. 13, 1931 2 Sheets-Sheet 1

Fig. 1

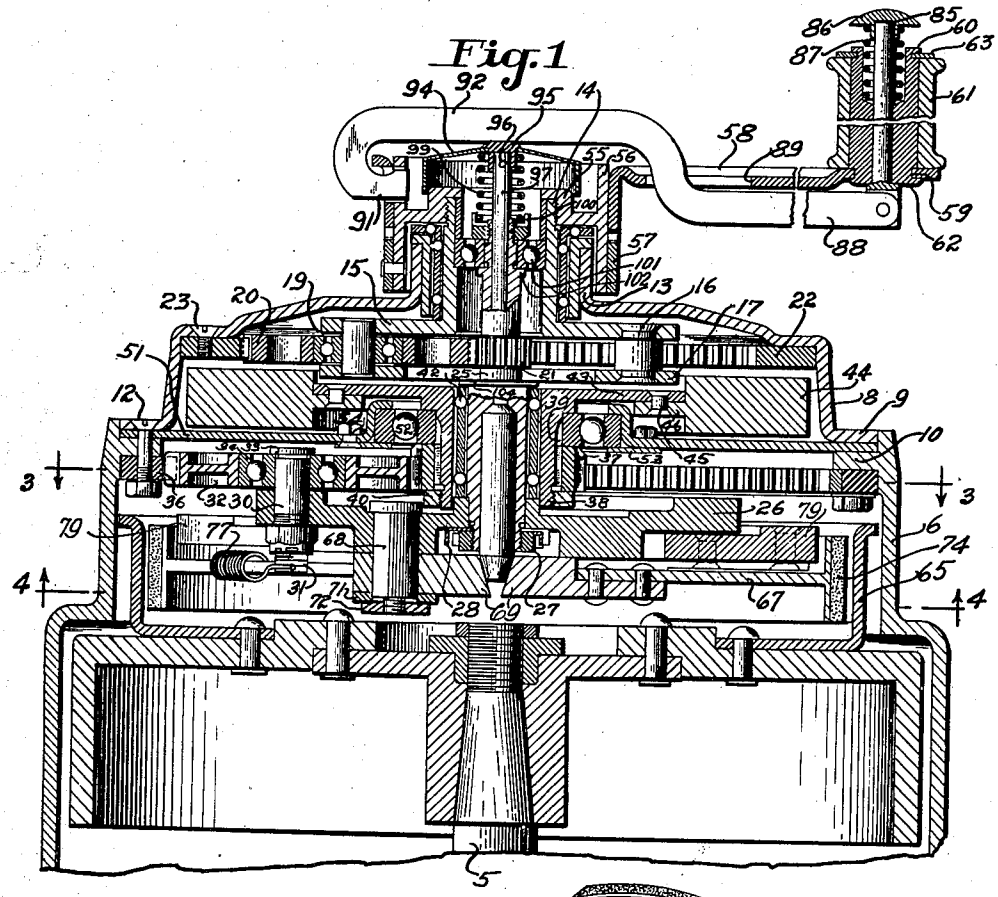
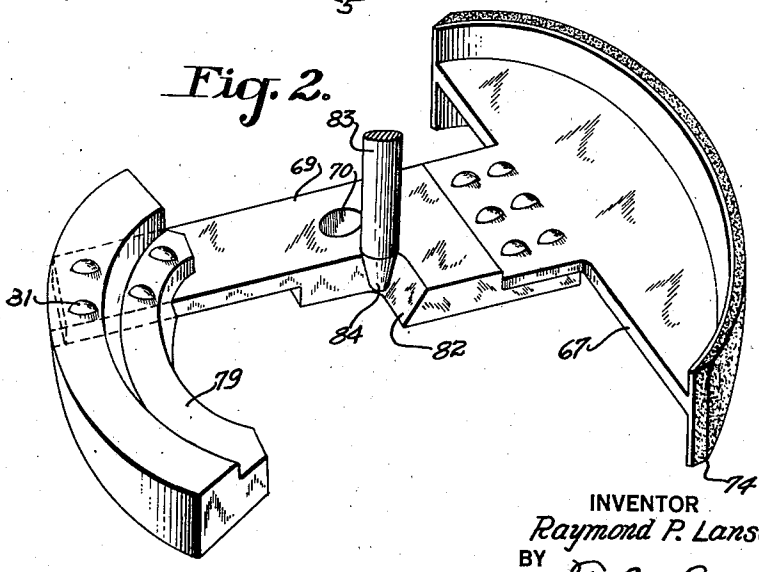


Fig. 2.



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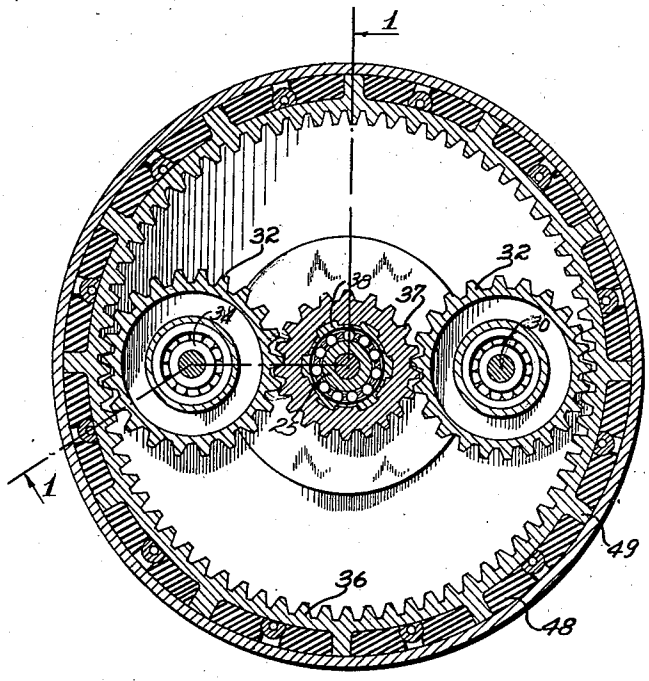

Fig. 3

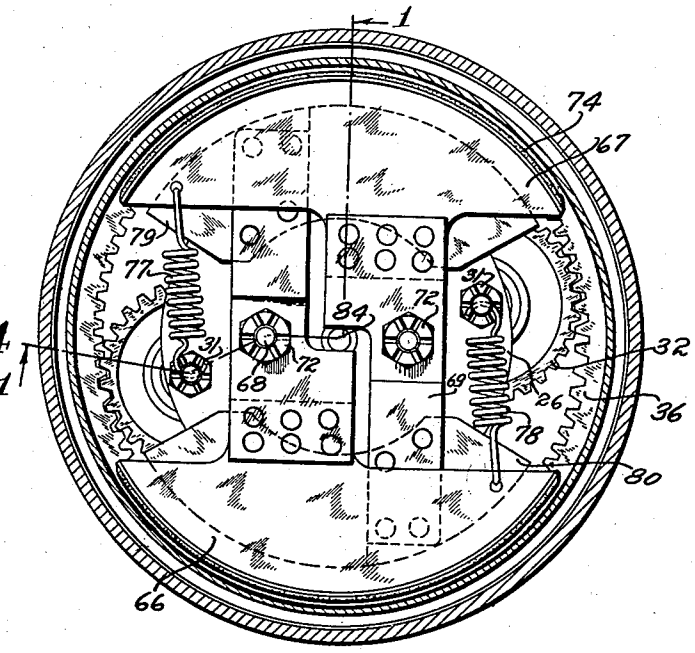

Fig. 4

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2,048,075

ENGINE STARTING MECHANISM

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Application February 13, 1931, Serial No. 515,637

23 Claims. (Cl. 123—179)

This invention relates to starting devices for internal combustion engines, and more particularly to a starter of the inertia type.

An object of the invention is to provide a starter of the inertia type embodying novel means for drivably connecting the starting apparatus to a member of the engine to be started.

A further object of the invention is to provide an inertia starter embodying novel driving means for operatively connecting the flywheel with the engine member to be rotated, whereby the energy stored in the flywheel may be imparted to said engine member at the desired time.

Another object of the invention is to provide an engine starter of the inertia type embodying novel means to transmit a driving torque in one direction only and which will prevent return torque transmission from the engine on starting under its own power.

Another object of the invention is to provide a novel starter of the inertia type which is completely self-contained, and the inertia element of which is preferably mounted above and carried by a member of the engine to be started.

Another object of the invention is to provide a novel inertia starter which is particularly adapted for use in starting outboard motors of the type now extensively employed on small boats.

A further object is to provide a starter of novel construction in which driving engagement is effected by a radial movement of normally withdrawn surfaces into frictional driving relation with a member of the engine to be started.

Another object is to provide an inertia starter employing radially movable driving members so controlled and disposed with respect to the engine member which they drive that their release occurs automatically upon starting of the engine under its own power.

A further object is to provide, in an inertia starter employing radially movable driving members of the foregoing type, novel counterbalancing means adapted to act in opposition to the forces tending to move said driving members toward the engine member which they drive.

Another object is to provide in a manually operated engine starter of the inertia type, novel multistage speed varying mechanism interposed between the manually operated member and the inertia member and adapted to drive the inertia member at a considerably multiplied speed, a portion of said mechanism being thereafter operable to transmit the energy thus stored in the inertia element to the engine engaging members at a considerably reduced speed.

Another object is to provide, in conjunction with a speed varying mechanism of the type just referred to, novel shock absorbing means for assimilating the reaction resulting from the transmission of starting torque from the inertia element to the engine member.

Another object of the invention is to provide in a manually operated engine starting mechanism employing an inertia element in which energy is stored for subsequent transmission to a member of the engine to be started, novel means for controlling the establishment of driving engagement between the inertia element and engine member.

A further object of the invention is to provide, in a manually operated engine starting mechanism embodying a novel engagement controlling means of the character just referred to, novel means permitting the continuance of the manual energizing action during the period of operation of said engagement controlling means. In this connection, a feature of the invention is the provision of a combined cranking and meshing member adapted to cooperate with the starting mechanism in such a way as to permit operation of both at the same time, if so desired by the operator.

Other objects of the invention reside in the construction and inter-relation of parts and will become apparent from inspection of the following specification when read with reference to the accompanying drawings wherein one embodiment of the invention is illustrated, but it is to be expressly understood that the drawings are for the purpose of illustration only, and are not designed as a definition of the limits of the invention, reference being had for this purpose to the appended claims.

In the drawings:

Fig. 1 is a central vertical section of a device embodying the invention the view being taken along the line 1—1 of Fig. 3;

Fig. 2 is a perspective view showing one of the driving shoes employed in the embodiment of Fig. 1;

Fig. 3 is a transverse sectional view of one of the planetary gear assemblies only, the view being taken along the line 3—3 of Fig. 1; and

Fig. 4 is a transverse sectional view taken along the line 4—4 of Fig. 1.

Referring to the drawings, and more particularly to Fig. 1, it will be seen that the engine to be started is provided with a rotatable shaft 5 which, if desired, may be integral with or secured

to the crankshaft of the engine, or a member drivably associated therewith.

The invention is shown embodied in novel starting or cranking means associated with the rotatable member 5 for developing and transmitting a starting torque to said member whereby the engine may be cranked. As shown, such means includes a housing 6 extending upwardly from around the engine member 5, said housing having an upper section 8 with an outwardly turned marginal flange 9 registering with section 6 and adapted to be supported on an inwardly turned flange 10 on the section 6, suitable means such as screw members 12 being provided to rigidly secure the flange 9 of section 8 to the flange 10 of section 6. The upper portion of section 8 is preferably provided with a centrally disposed hub 13 having a central opening through which extends the cylindrical hub 14 of a yoke or spider member 15 provided for a purpose presently to be described.

Novel means are employed for storing up energy to be subsequently used at the will of the operator for rotating the engine member 5 and thereby starting the engine. As shown, such means is preferably constituted by an inertia member adapted to be rotated at high speed through suitable gearing drivably connected to a cranking member, the gearing being preferably divided into two or more stages. For this purpose, the spider 15 above referred to is provided with a plurality of supporting posts 16 extending downwardly to retain in place an annular member or ring 17 on which is rotatably supported, with the aid of ball bearings 19, a corresponding number of driving gears 20 adapted to mesh with a sun gear or pinion 21 and also with the teeth of an internal or annulus gear 22 which is secured to the housing section 8 by suitable means as indicated at 23. As shown, the gears 20, 21 and 22 constitute a planetary system of gears operating in response to rotation of member 14 to impart rotation at a multiplied speed to the inertia means to be described, the gear 21 being preferably integral with a centrally disposed shaft 25.

Novel means are provided for drivably connecting the shaft 25 with the second stage of the gearing which leads to the inertia member. As shown, such means preferably involves the provision at the lower end of shaft 25 of a recessed apertured plate or spider 26 rotatable in response to rotation of the sun gear 21 by the means above described. The supporting means for spider 26 may be of any suitable form, but, as shown, consists in the provision of a threaded reduced portion at the lower end of shaft 25 to which is secured a nut 27 adapted to hold in place, with the aid of locking washer 28, the aforesaid spider 26. Near the outer periphery of spider 26 are located a plurality, (as shown, two) supporting posts or bolts 30 having threaded lower ends 31 for a purpose to be described, said bolts being adapted to retain on their upper portions a corresponding number of gears 32, the bolts being preferably enlarged as indicated at 33 to retain these gears in place, and bearings 34 being provided to facilitate rotation of said gears. The rotation of these gears about their own axes is preferably brought about by providing an internal gear 36 which, although fixed relatively to the gears 32, is capable of limited angular movement by virtue of the provision of novel means to be described.

The novel means for imparting rotation to the inertia member at a greatly multiplied speed, in response to the rotation of the member 14, further includes a second sun gear or pinion 37 having teeth meshing with the teeth of gears 32 and hence adapted to be rotated thereby, the gear 37 being rigidly secured to a member 38 by suitable means which, as illustrated, takes the form of splines 39, a retaining nut 40 being threaded to the lower end of member 38. Member 38 is in turn rotatable relatively to the driving shaft 25, the relative rotation between the two being facilitated by the provision of suitable bearing means as indicated at 42. The member 38 is also provided at its upper end with an outwardly turned flange 43 adapted to be secured to an inertia member 44 by suitable means which in the form shown comprises a plurality of studs or rivets 45 rigidly connecting the flange 43 with an inwardly extending annular flange 46 provided on the inertia member, or flywheel 44.

Novel means are provided for permitting limited angular movement of the internally toothed gear 36 relatively to the housing 6 so as to absorb shocks, particularly the shock incident to the initial driving engagement between the starter and engine, and otherwise steady the operation of the planetary gears 32 and the other parts involved in the cranking operation. As illustrated in Fig. 3, such means preferably comprises the provision of a plurality of cushioning members 48 composed of suitable elastic material and mounted in recesses formed in the radial projections 49 on the gear 36, these cushioning members 48 being secured to the housing 6 by any suitable means which, if desired, may be the bolts 12 above referred to. The bolts 12 also serve to hold in place a transversely disposed plate or partition 51 which is adapted to support a ball bearing 52 representing any suitable means upon which the flywheel 44 and flanged member 38 may be rotatably mounted, the ball bearing member 52 being preferably adapted to rest at its outer edge on the supporting plate 53 rigidly fastened to the partition 51 by suitable means as indicated at 54.

Novel manually operated means are provided for engagement with the hub 14 to cause rotation thereof and consequent storing of energy in the inertia member 44 through the speed multiplying mechanism above described. As illustrated in Fig. 1 such means preferably comprises the provision of a threaded upper portion on member 14 for engagement with an internally threaded member 55 having a transversely extending section which at its outer edge turns in both the upward and downward directions to form a sleeve 56, the downwardly extending portion having secured thereto a cylindrical encasing member 57 at the upper edge of which, on one side thereof there extends outwardly in a substantially horizontal direction an arm 58 provided with an aperture 59 through which passes a post 60 which, together with the surrounding sleeve 61, constitutes a handle by means of which rotation is imparted to the member 55 and the hub 14 threadedly secured thereto.

The post 60 may be secured to the outer end of crank arm 58 by any suitable means as, for example, by being peened over at its lower end, as indicated at 62 in Fig. 1, and the sleeve 61 may likewise be secured in place by suitable means such as collar 63 fitting in a circumferential groove provided near the upper end of post 60.

Novel means are provided for operatively connecting the flywheel 44, after the desired amount

of energy has been stored therein through operation of the cranking means just described, to the engine member 5 to produce starting of the engine through cranking action. Stated broadly, such novel means comprises the provision of a cylindrical member or drum, such as that indicated at 65, preferably rigidly secured to the shaft 5, in combination with a plurality of elements such as those indicated at 66 and 67 (Figs. 1, 2 and 4) having convex frictional surfaces adapted to be moved radially into engagement with the drum 65 by operation of the manually controlled meshing means to be described.

These radially movable elements 66 and 67 are adapted to rotate with the recessed plate or spider 26 to which said elements are pivotally secured by suitable means as, for example, the transversely extending arms 69 provided with apertures 70 (Fig. 2) for reception of studs 68, the studs being held in place by suitable means as, for example, the castellated nut 72 (Figs. 1 and 4) engaging the lower threaded ends thereof. On the convex arcuate rims of elements 66 and 67 are provided correspondingly shaped bands 74 of suitable friction material, the curvature of these bands being preferably such as to render the elements 66 and 67 self-energizing, that is, cause them to register snugly with the inner surface of drum 65 upon radial movement from their normal positions as shown in Fig. 1.

Novel means are provided for maintaining the members 66 and 67 in non-engaging position with respect to the drum 65 notwithstanding the tendency of such elements to move outward radially in response to the centrifugal force resulting from rotation of these elements during the cranking operation. As shown, such means comprises, first, a plurality of resilient means so positioned as to oppose the centrifugal action, and secondly, the provision of suitable counterbalancing means also tending to oppose the centrifugal action. The resilient means preferably comprises a pair of springs 77 and 78 (Figs. 1 and 4) the former being fastened at one end to the element 67 and at its other end to the lower end of post 30, while the latter is fastened to the element 66 at one end and at the other end to the post 31, the points of attachment being so located with respect to the pivots 68 on which the friction elements are suspended and with respect to the axis of rotation of these elements, that they exert a resilient force in opposition to the centrifugal force resulting from rotation of the parts.

The novel counterbalancing means which acts in conjunction with the above described resilient means to oppose the centrifugal force created by the rotation of members 66 and 67, and maintain such elements in non-driving position during cranking operation, comprises preferably a pair of weighted arcuate members 79 and 80 rigidly secured, as by rivets 81, to the outer ends of the cross-arms 69. These counterweights are preferably positioned diametrically opposite to the arcuate driving elements 66 and 67, so as to have maximum counterbalancing effect, the elements 66 and 67 being preferably unsymmetrically located with respect to the cross-arms 69 (as shown in Figs. 2 and 4). This unsymmetrical mounting of the friction elements and counterweights 79 also has the advantage of permitting the arrangement of the cross-arms 69, in parallelism as indicated in Fig. 4. It will also be noted that the counterbalancing weights 79 are attached to the cross-arms 69 in such a manner as to permit superimposing the friction elements 66 and 67 thereupon, as indicated best in Fig. 4.

Novel means are provided to move the elements 66 and 67 outwardly in a radial direction into frictional driving contact with the surface of drum 65, such novel means also permitting the continuance of the manual cranking action through handcrank 58, if so desired. For this purpose cross arms 69 are preferably provided with sloping shoulders, as indicated at 82, spaced apart sufficiently to permit their being engaged by the centrally and vertically disposed rod 83, the lower end 84 of which is of conical shape, the degree of taper being such as to correspond to the angle of slope of members 69 whereby upon downward movement of rod 83 a wedging action is produced which moves the cross-arms 69 away from each other thereby moving the friction elements 66 and 67 into engagement with the drum 65.

Downward movement is imparted to the rod 83 by operation of novel meshing means associated with the handcrank 58 and preferably comprising a pin 85 having a knob or button 86 secured to its upper end, the pin and knob being normally held in the position indicated in Fig. 1 by suitable means such as spring 85 located in a recess formed in post 60. To the lower end of pin 85 is pivotally secured an arm 88 extending beneath the crankarm 58 for a suitable distance and then turning upwardly through an aperture in member 89 to pass over the upper portion of the starter casing and then turn downwardly and inwardly forming a hooked end 91 extending loosely into casing 57 and also into the upwardly extending portion of sleeve 56, as shown clearly in Fig. 1.

Cooperating with the central portion 92 of arm 88 is a cap 94 having a knob or other suitable striker member 95 centrally disposed thereon, the said knob 95 being preferably secured, as indicated at 96, to the upper end 97 of the rod 83, the rod and knob being normally urged upwardly by suitable means such as the spring 99 which thereby holds the rod 83 normally in the position indicated at Fig. 1. The spring 99 is provided with a seat 100, the latter being supported on a bearing member 101 about which the shaft 14 revolves, the said bearing member being in turn supported on collar 102 formed on the upper end of shaft 25, the said shaft being provided with a second collar 104 resting on bearing 43 previously referred to.

Having now enumerated the parts entering into the construction illustrated, the operation of this embodiment of the invention will now be described.

When it is desired to start the engine, the crank 58 is rotated by means of the handle 61 (which preferably remains in place at all times, such rotation operating to store energy in flywheel 44 through the speed multiplying means above described, the path of transmission being from the member 57 to the member 56, thence to the shaft 14, spider 15, and planetary gears 20 to the sun gear 21, thence through shaft 25 to the spider 26, and thence to the planetary gears 32, sun gear 37 and hub 38 to the flywheel 44.

When the flywheel has by the foregoing means been brought up to a speed sufficient to store the desired amount of energy for use in cranking the engine, the operator may press downwardly on button 86 thereby producing a downward pressure on knob 95 to compress spring 99 and move

rod 83 downwardly to cause a corresponding radial movement of members 66 and 67 into engagement with the surface of drum 65 and thereby rotate shaft 5, bringing the engine up to a sufficient speed to produce starting thereof under its own power, it being understood that the operator may at the same time, if he so desires, continue energizing the flywheel by rotation of the crank 58.

Whether or not rotation of crank 58 is continued after the meshing operation is effected, the energy stored in the flywheel will be transferred to the engine member 5 through only the second stage of gearing; that is, the planetary system shown at 32, 36 and 37. This is of particular advantage in that it permits continued cranking of the engine at a speed intermediate the initial cranking speed and the speed of the flywheel. Thus it is possible to secure a reasonably high speed of rotation for a sufficiently long period to insure starting of the engine under its own power.

There is thus provided a novel engine starter of the inertia type which is simple and rugged in structure, inexpensive to manufacture and efficient in operation. It is especially adapted for use with small engines because of its compactness and light weight, but since it is a self-contained unit it may be easily attached to any engine, and requires no external supporting means, the whole unit in the embodiment shown, being mounted within an extension of the engine housing and part of the mechanism being carried by a rotating member of the engine.

If desired, the invention may be embodied in a starter of the reaction type, wherein the entire mechanism is carried by, and rotates with, the engine member to be cranked. Such an embodiment involves the upward extension of drums 65 to constitute a housing for the entire starter, thereby eliminating the parts shown at 6 and 8 in the form illustrated. Likewise, any other known form of cranking and meshing means, either manual or otherwise, may be substituted for those shown in the drawings.

It is to be understood that various other changes may be made in the form, details of construction, arrangement of parts and the uses to which they are applied, without departing from the spirit of the invention or the scope of the appended claims.

I claim:

1. In an engine starting mechanism of the type embodying a crank rotatable to store energy in a flywheel for subsequent transmission to a member of the engine to be started, the combination with said crank and flywheel of a multistage gear train drivably connecting said crank and flywheel, and means for drivably connecting said flywheel to said engine member, said last named means including only one stage of said gear train.

2. In combination with a rotatable member of an engine to be started, a cylindrical member attached to said engine member, a flywheel in which energy is stored for starting the engine, said flywheel being adapted for rotation relative to said cylindrical member during the energy storing operation, counter-balanced means driven by said flywheel and movable into driving engagement with said cylindrical member to cause a transmission of starting torque through said cylindrical member to said rotatable engine member, and means for establishing driving engagement between said counterbalanced means and said cylindrical member.

3. In an engine starting mechanism of the type employing an inertia member in which energy is stored to be subsequently expended in rotating a member of the engine to be started, the combination with said rotatable member and said inertia member of a drum mounted on said engine member to rotate therewith, a pair of parallel cross-arms driven by said inertia member, friction means at one end of each of said cross-arms adapted to move into engagement with said drum to cause transmission of starting torque from said inertia member to said drum and engine member, and means at the opposite ends of said cross-arms for counterbalancing the engaging tendency of said friction means.

4. An engine starting mechanism comprising in combination with a rotatable member of the engine to be started, an inertia member, means for actuating said inertia member to store energy therein, a casing enclosing said inertia member, eccentrically disposed mechanism driven by said inertia member and tending to move radially into engagement with said rotatable engine member, means normally holding said eccentrically disposed mechanism against such radial movement comprising a counterweight and a member connecting said mechanism with said counterweight, and means for rendering said holding means ineffective to prevent said radial movement, said means comprising a rod cooperating with said connecting member and extending through said inertia member and casing in coaxial relation thereto.

5. In combination, a driving member, a rotatable driven member, and torque transmitting means adapted to drivably connect said members including a pair of counterbalanced, self-energizing, friction members connected to the driving member and adapted for movement into engagement with the driven member, a pair of counterbalancing weights each of which is contoured for superimposition upon one of said friction members, and a pair of parallel cross-arms connecting said weights with said friction members.

6. In combination, a driving member, a rotatable driven member, and torque transmitting means adapted to drivably connect said members including a counterbalanced, self-energizing friction member connected to the driving member, a counterbalancing weight contoured for superimposition upon said friction member, a pair of parallel cross-arms one of which is attached to said friction member and the other to said weight, and means engageable with said cross-arms for moving said friction member radially into driving engagement with the driven member.

7. An engine starting mechanism of the type embodying a hand crank rotatable to store energy in a flywheel for subsequent transmission to a member of the engine to be started, the combination with said handcrank and flywheel of a driving member normally out of engagement with said engine member but movable into such engagement to drivably connect said flywheel and engine member, means for meshing said driving member with said engine member and common supporting means for said handcrank and meshing means to facilitate maintenance of said meshing means in the operative position during continued rotation of said handcrank.

8. In an engine starter of the type embodying a highspeed flywheel in which energy is stored

for subsequent transmission to a member of the engine to be started, the combination with said flywheel of self-energizing means eccentrically mounted with respect to the axis of rotation of said flywheel and engine member, and means for causing said self-energizing means to drivably connect said flywheel and engine member, said last named means comprising a member movable along said axis into registry with said self-energizing means.

9. In an engine starter of the type embodying a high speed flywheel in which energy is stored for subsequent transmission to the engine to be started, the combination with said flywheel of self energizing means eccentrically mounted with respect to the axis of rotation of said flywheel and engine member, and means for causing said self-energizing means to drivably connect said flywheel and engine member, said means comprising an inclined surface on said self-energizing means, and a second inclined surface movable along said axis into registry therewith.

10. In apparatus of the character described a pair of friction elements of the self-energizing type, a pair of parallel cross-arms secured to said friction elements, a member adapted to be engaged by said friction elements, means engageable with said cross-arms to move said friction elements into engagement with said member, and means contoured for superimposing upon one of said friction elements for counterbalancing the effect of the other friction element.

11. In apparatus of the character described, friction elements of the self-energizing type, means including parallel cross-arms secured to said friction elements for rotating said friction elements, a driven member adapted to be engaged and rotated by said friction elements in response to operation of said rotating means, counterbalancing means disposed in nested relation to said friction elements for normally preventing movement of said friction elements into driving engagement with said driven member, and means engageable with said cross-arms for effecting such driving engagement notwithstanding said counterbalancing means.

12. In apparatus of the character described friction elements of the self-energizing type, means for rotating said friction elements, a driven member adapted to be engaged and rotated by said friction elements in response to operation of said rotating means, counterbalancing means normally preventing movement of said friction elements into driving engagement with said driven member, means for effecting such driving engagement notwithstanding said counterbalancing means, said last named means comprising inclined surfaces on said friction elements and a cooperating member having an inclined surface adapted to register therewith.

13. In apparatus of the character described, friction elements, means for rotating said friction elements comprising an inertia member and gearing drivably connecting said inertia member to said friction elements, a driven member adapted to be engaged and rotated by said friction elements in response to operation of said rotating means, means normally preventing movement of said friction elements into driving engagement with said driven member means for effecting such driving engagement notwithstanding said preventing means, and means including said gearing for initially energizing said inertia member.

14. In an engine starter of the type embodying an inertia member in which energy is stored for transmission to a member of the engine to be started, speed reducing mechanism drivably connecting said inertia member with said engine member, and buffer means associated with said speed reducing mechanism for absorbing the reaction resulting from the transmission of said energy to said engine member.

15. In an engine starter of the type embodying an inertia member in which energy is stored for transmission to a member of the engine to be started, speed reducing mechanism drivably connecting said inertia member with said engine member, means associated with said speed reducing mechanism for absorbing the reaction resulting from the transmission of said energy to said engine member, said means comprising a casing enclosing said inertia member, a member meshing with said speed reducing mechanism and constituting a track about which said mechanism revolves, and elastic means interposed between said casing and track to limit the angular movement of said track.

16. In an engine starting mechanism having an inertia member in which energy is stored for subsequent transmission to a member secured to the engine to be started, the combination with said inertia member and engine member of means for drivably connecting said inertia member and said engine member to transmit starting torque to said engine, said means comprising a mechanism rotatable with said inertia member and movable radially into engagement with said engine member, and means for moving said mechanism radially toward said engine member, said means comprising an inclined surface on said rotatable mechanism, and a cooperating member having an inclined surface movable into registry therewith.

17. In an engine starting mechanism of the type embodying a hand crank rotatable to store energy in a flywheel for subsequent transmission to a member of the engine to be started, the combination with said handcrank and flywheel of a multi-stage gear train drivably connecting said hand crank and flywheel, and means for drivably connecting said bywheel to said engine member, said last named means including a portion of said gear train.

18. In an engine starting mechanism of the type embodying a hand crank rotatable to store energy in a flywheel for subsequent transmission to a member of the engine to be started, the combination with said handcrank and flywheel of a gear train having parts disposed adjacent both faces of said flywheel and drivably connecting said handcrank and flywheel, and means for drivably connecting said flywheel to said engine member, said last named means including only that part of said gear train which is disposed adjacent one face of said flywheel.

19. In combination with a rotatable member of an engine to be started, a cylindrical member attached to said engine member, a flywheel in which energy is stored for starting the engine, said flywheel being adapted for rotation relative to said cylindrical member during the energy storing operation, counter-balanced means driven by said flywheel and movable into driving engagement with said cylindrical member to cause a transmission of starting torque through said cylindrical member to said rotatable engine member, and means extending through said flywheel for establishing driving engagement between said

counter-balanced means and said cylindrical member.

20. An engine starting mechanism comprising in combination with a rotatable member of the engine to be started, an inertia member, means for actuating said inertia member to store energy therein, a casing enclosing said inertia member, mechanism driven by said inertia member and tending to move radially into engagement with said rotatable engine member, means normally holding said mechanism against such radial movement comprising a counterweight, and means for rendering said holding means ineffective to prevent said radial movement, said means comprising a rod cooperating with said connecting member and extending through said inertia member and casing.

21. An engine starting mechanism of the type embodying a handcrank rotatable to develop energy for transmission to a member of the engine to be started, the combination with said handcrank of a driving member adapted to engage said engine member, means including a part associated with the handle of said handle crank for meshing said driving member with said engine member, and common supporting means for said handcrank and meshing means to facilitate maintenance of said meshing means in the operative position during continued rotation of said handcrank.

22. In an engine starting mechanism of the type embodying a hand crank rotatable to store energy in a flywheel for subsequent transmission to a member of the engine to be started, the combination with said handcrank and flywheel of a torque transmitting means having parts disposed adjacent both faces of said flywheel and drivably connecting said handcrank and flywheel, and means for drivably connecting said flywheel to said engine member, said last named means including only that part of said torque transmitting means which is disposed adjacent one face of said flywheel.

23. An engine starting mechanism of the type embodying a handcrank rotatable to store energy for subsequent transmission to a member of the engine to be started, the combination with said handcrank of a driving member adapted to engage said engine member, means including a part mounted in the handle of said handcrank for meshing said driving member with said engine member, and common supporting means for said handcrank and meshing means to facilitate maintenance of said meshing means in the operative position during continued rotation of said handcrank.

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