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GOVERNING MECHANISM FOR INTERNAL COMBUSTION ENGINES.

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NO MODEL.

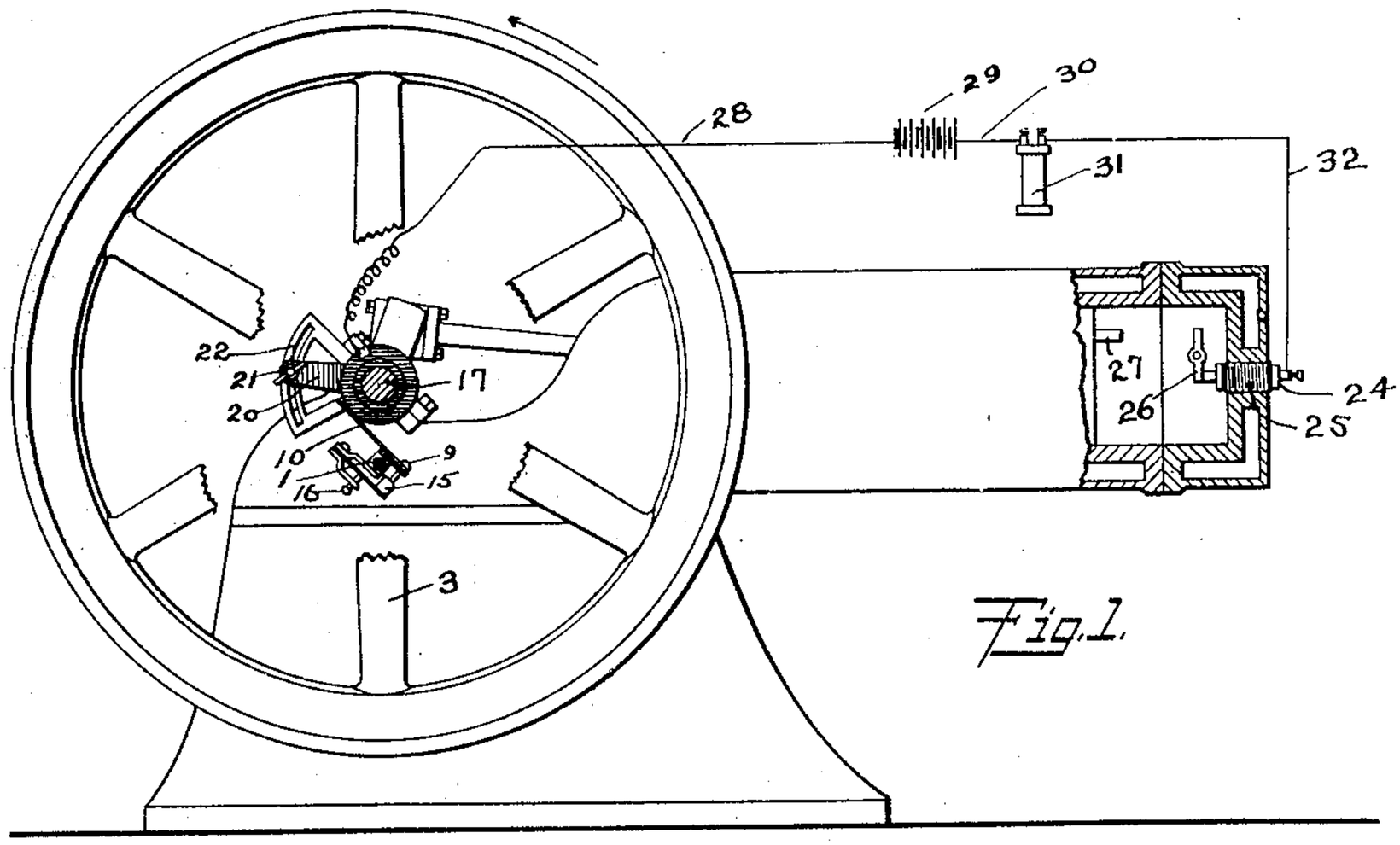

Fig. 1.

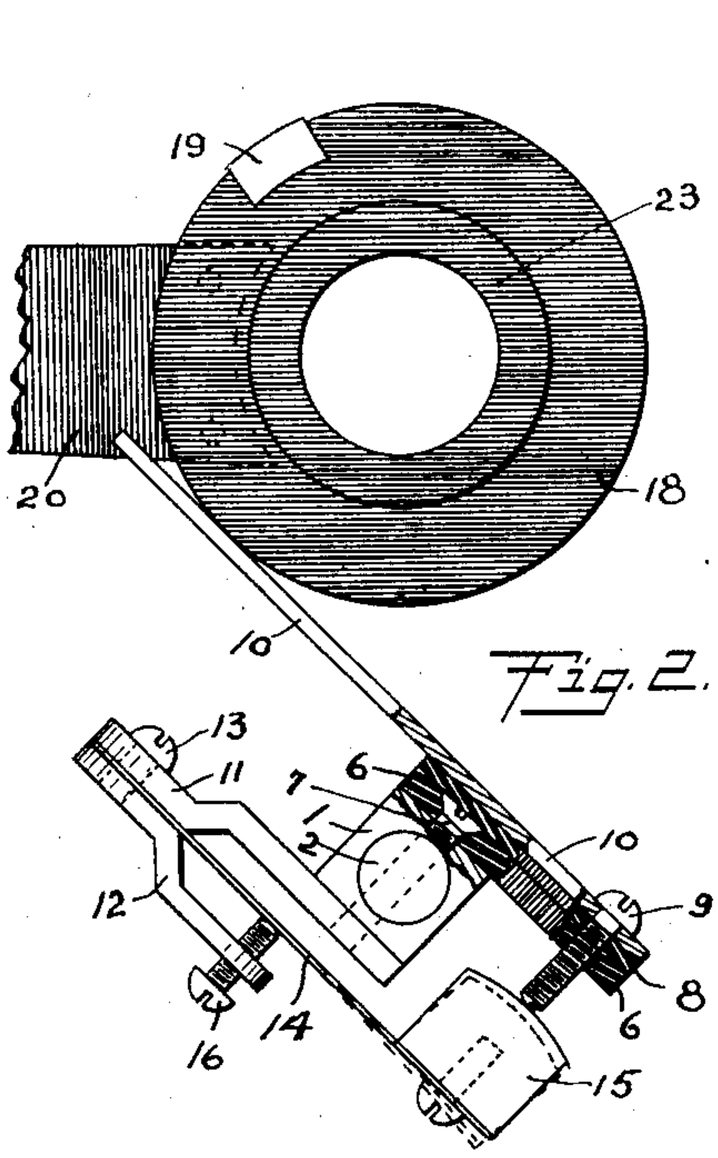

Fig. 2.

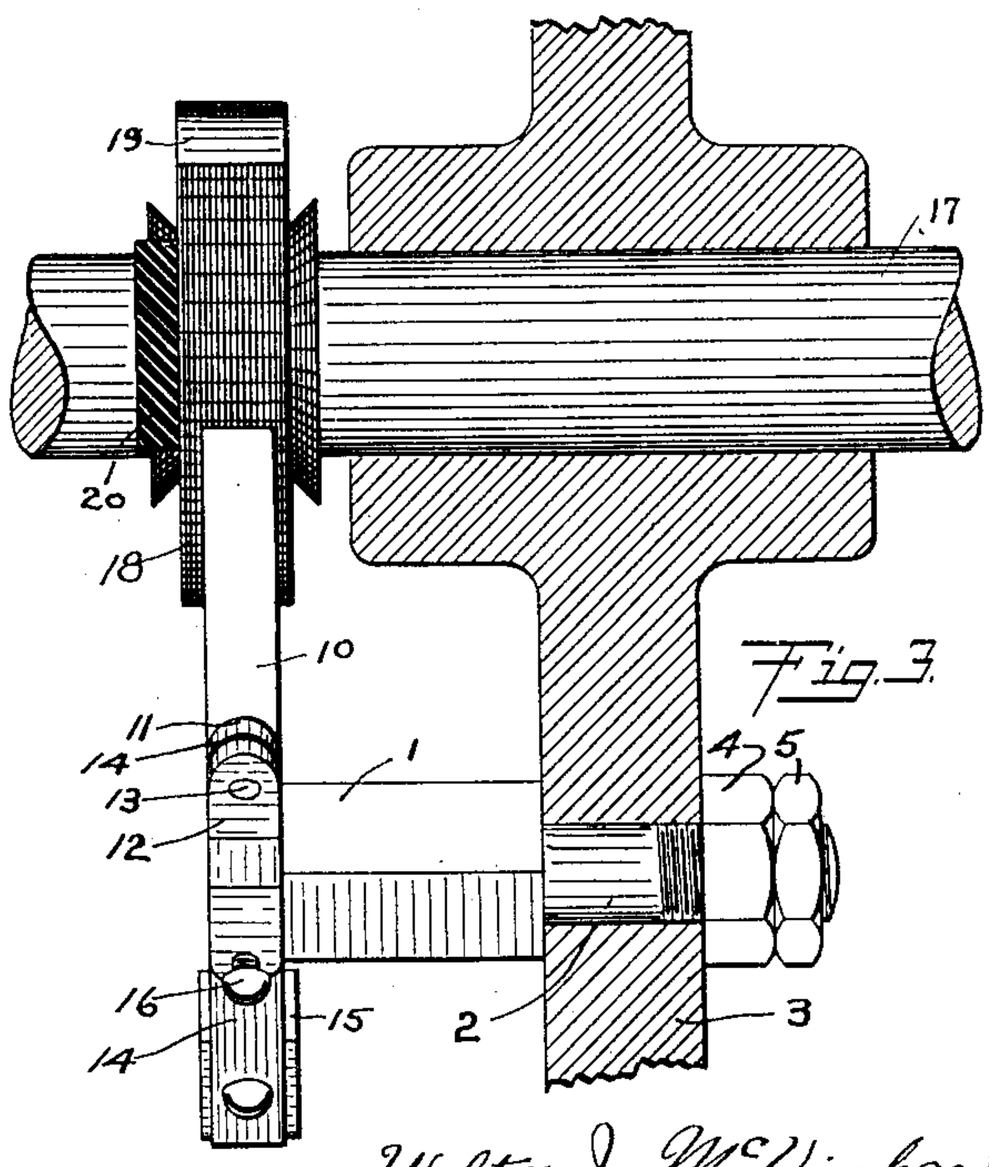

Fig. 3.

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UNITED STATES PATENT OFFICE.

WALTER J. McVICKER, OF ROGERS, NEBRASKA.

GOVERNING MECHANISM FOR INTERNAL-COMBUSTION ENGINES.

SPECIFICATION forming part of Letters Patent No. 753,091, dated February 23, 1904.

Application filed March 7, 1903. Serial No. 146,637. (No model.)

To all whom it may concern:

Be it known that I, WALTER J. McVICKER, a citizen of the United States, residing at Rogers, in the county of Colfax and State of Nebraska, have invented certain new and useful Improvements in Governing Mechanism for Internal-Combustion Engines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to governing mechanism for internal-combustion engines, and particularly for engines of the said type which are fired or ignited by an electric spark.

It is the object of my invention to provide a simple and inexpensive means by which the speed of engines of this class may be automatically controlled by breaking the igniting-circuit when the speed rises above the normal and closing the said circuit again as soon as the speed falls to or below the normal.

A further object of my invention is to provide a governing mechanism of the class named which shall be extremely sensitive and quick acting in case of sudden acceleration or slowing of speed of the engine, as when the load thereof is suddenly thrown off or on. The latter object is attained by eliminating entirely the element of friction usually found in centrifugal governing mechanism, thus making the amount of force necessary to operate the governor dependent entirely on the tension of a spring, and by so arranging the governor-weight that in addition to movements thereof resulting from centrifugal force the same may be moved relative to the other parts by its own inertia in case of sudden slowing or acceleration of the engine, as from sudden increase or decrease of its load.

In the accompanying drawings, Figure 1 is a side elevation of an engine provided with devices embodying my invention, a portion being broken away to show the more remotely-lying parts. Fig. 2 is a detail side elevation of the governing devices, and Fig. 3 is a detail end elevation of the same.

In the construction shown a rectangular metallic block 1 has a round stem 2 formed thereon and passing through one of the arms 3 of the fly-wheel. The outer end of the stem 2 is threaded and has the nut 4 and jam-nut 5 thereon, whereby the rectangular block may be pulled against the face of the arm 3 and securely held in any desired position.

To one face of the block 1 a piece of insulating material 6 is secured by the screw 7. A second piece of insulating material 8 is secured to 6 by a screw 9, which also serves to hold in position the metallic brush 10. The brush 10 is insulated from the screw 7 by the insulation 8.

On the face of the block 1 opposite the insulation 6 and 8 the metallic arm 11 is secured by the screw 7. To the end of the arm 11 a second arm 12 is secured by a screw 13, and between the two arms is clamped the end of the flat spring 14. On the free end of the spring 14 is a small weight 15, which normally rests against the end of the screw 9 and makes electrical contact therewith. The arms 11 and 12 are bent, as shown, so that they are separated, except where the spring 14 is held between the same. Near the free end of the arm 12 is a screw 16 for adjusting the tension of the spring 14.

Fitted loosely on the crank-shaft 17 and adjacent to the hub of the fly-wheel is a disk 18, of insulating material, having a metallic block 19 set into the face thereof, as shown in the drawings. A handle 20, which may also be of insulating material, is secured to the disk 18 and at the end thereof has a thumb-nut 21, connecting with a circular slot in a fan-shaped sector 22, secured to the crank-shaft bearing or to any stationary part of the engine. By means of the handle 20 and the thumb-nut the disk may be adjusted to any desired position and there secured by tightening the nut and clamping the handle against the stationary sector 22. The position of the block 1 and stem 2 is so adjusted in the fly-wheel arm 3 that the brush 10 bears against the periphery of the disk 18, as shown. On the sides of the disk 18 are formed the collars 23, which are in the form of truncated cones with their bases facing away from the disk. These collars prevent oil or grease from the bearing from creeping onto the face of the disk, as the oil, &c., may collect on the edges of the collars

and thence drip off without finding its way along the sides of the disk and reaching the face thereof.

In Fig. 1 of the drawings I have shown an igniter of ordinary form in which the insulated pole 24 passes through the plug 25, screwed into the cylinder-head, and touches the movable T-head 26. Contact between the T-head and insulated pole 23 is broken by the pin 27 on the piston-head striking one side of the T and pressing the other side of the same away from the insulated pole.

From the metallic block 19 a wire 28 extends to a battery 29, a wire 30 connects the battery to one of the binding-posts of a spark-coil 31, and from the said coil a wire 32 extends to the insulated pole 24 of the igniter. When the fly-wheel of the engine is in such a position that the brush 10 rests on the block 19, a circuit is closed as follows: from the battery 29 to the wire 28, block 19, brush 10, screw 9, weight 15, spring 14, arm 11, block 1, stem 2, through the fly-wheel, crank-shaft, and frame of the engine to the T 26, pole 24, wire 32, coil 31, and wire 30 to the battery.

The operation of the mechanism is as follows: The disk 18 is turned to such a position that the brush 10 will be in contact with the block 19 just before and during that period of the engine cycle when the pin 27 on the piston-head breaks the contact between the T-head 26 and the insulated pole 24. The disk being locked in said position by means of the thumb-nut 21 and sector 22, the igniter-circuit will be closed at the proper time to produce a spark at the igniter in the usual manner and during the rest of the cycle the circuit will open, as the brush 10 will rest on the insulating portion of the disk. When the speed of the engine reaches a certain limit, determined by the tension on the spring 14, the centrifugal force of the weight 15 causes the same to move outward against the tension of the spring 14, as shown by the dotted lines in Fig. 2, thus opening the igniter-circuit at the point of contact between the weight and the screw 9. On the speed of the engine again falling to the normal the tension of the spring 14 overcomes the centrifugal force of the weight, causing the same to again make contact with the screw 9, close the igniter-circuit, and permit the firing of the explosive mixture in the engine-cylinder.

The arrangement of the weight 15 and spring 14 relative to the direction of movement of the fly-wheel, as indicated in Fig. 1, should be particularly noted. It will be seen that in addition to being set so that the centrifugal force of the weight tends to move the same away from the contact-point of the screw 9 the said contact-point moves ahead of the weight, so that in case of sudden acceleration of speed of the fly-wheel, the contact-point being rigidly connected therewith, the inertia of the weight tends to allow the contact-point to move away from the same and open the igniter-circuit, while in case of sudden slowing of speed of the engine the intertia of the weight tends to move the same toward the contact-point and close the igniter-circuit. Thus when a load is thrown suddenly on or off the engine the rapid action of the governor is greatly facilitated, with the result that the engine almost instantly resumes its normal speed.

It will be obvious that the governing mechanism shown may be considerably modified without departing from the spirit of my invention. Instead of placing the same on the fly-wheel or the crank-shaft of the engine it may be placed on any shaft or wheel driven by the engine. Instead of the form of igniter shown my mechanism may be used with a jump-spark igniter or any other igniter depending for its action on an electric current. When used with a jump-spark igniter, the circuit through the governing mechanism will be connected with the primary of an induction-coil and the secondary terminals of the coil are connected with the igniter in the usual manner; also, when used with a jump-spark igniter the time of firing may be regulated for any period of the engine cycle by changing the position of the disk 18 relative to the sector 22.

Now, having described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. As a governing mechanism for an internal-combustion engine and in combination with an electrically-controlled igniter therefor, an engine-driven rotative member, a spring secured to said rotative member, a weight carried by said spring, a contact-screw on said rotative member with which the weight is normally held in engagement by the spring, and an igniter-controlling circuit of which said weight and contact-screw are a part, the arrangement being such that the weight may by its centrifugal force move away from the contact-screw and break the igniter-controlling circuit when the speed of the rotative member reaches a predetermined limit, and the direction of rotation relative to the weight and contact-screw being such that the weight will follow the contact-screw, whereby upon a sudden acceleration of the rotative member the weight will tend by its inertia to fall behind the contact-screw and break the igniter-controlling circuit, or upon a sudden slowing of speed of the rotative member the weight will tend by its inertia to overtake the contact-screw and close the igniter-controlling circuit.

2. As a governing mechanism for an internal-combustion engine and in combination with an electrically-controlled igniter therefor, an engine-driven rotative member, a spring secured thereto, means for adjusting the tension of said spring, a weight carried

by the spring and adapted to move in a direction partly radial to the axis of rotation and partly concentric thereto, a contact-screw carried on said rotative member with which the weight is normally held in engagement by the spring, and an igniter-controlling circuit of which said weight and contact-screw are a part, the arrangement being such that the weight may by its centrifugal force move away from the contact-screw and break the igniter-controlling circuit when the speed of the rotative member reaches a definite limit, and the direction of movement of the rotative member relative to the weight and contact-screw being such that the weight will follow the contact-screw, whereby upon a sudden acceleration of the rotative member the weight will tend by its inertia to fall behind the contact-screw and break the igniter-controlling circuit, or upon a sudden slowing of speed of the rotative member the weight will tend by its inertia to overtake the contact-screw and close the igniter-controlling circuit.

In testimony whereof I hereunto affix my signature in presence of two witnesses.

WALTER J. McVICKER.

Witnesses:
D. O. BARNELL,
JOS. P. WAGNER.