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J. MOLNAR

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TOY AIRPLANE MOTOR

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2 Sheets-Sheet 1

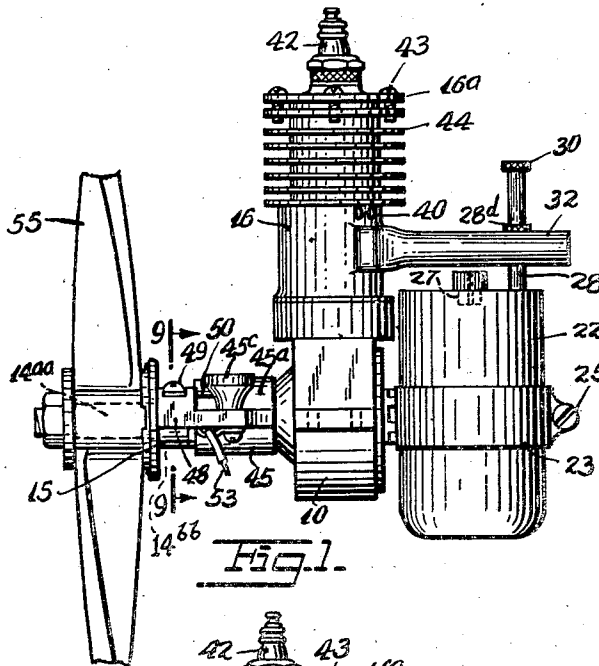


Fig. 1.

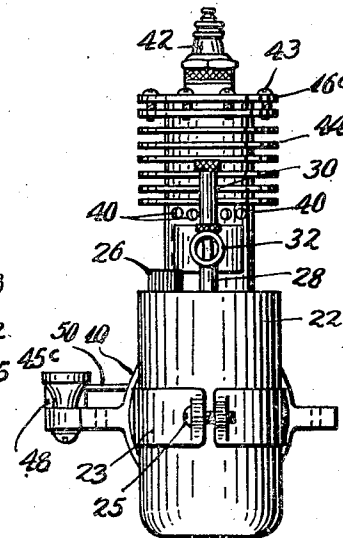


Fig. 2.

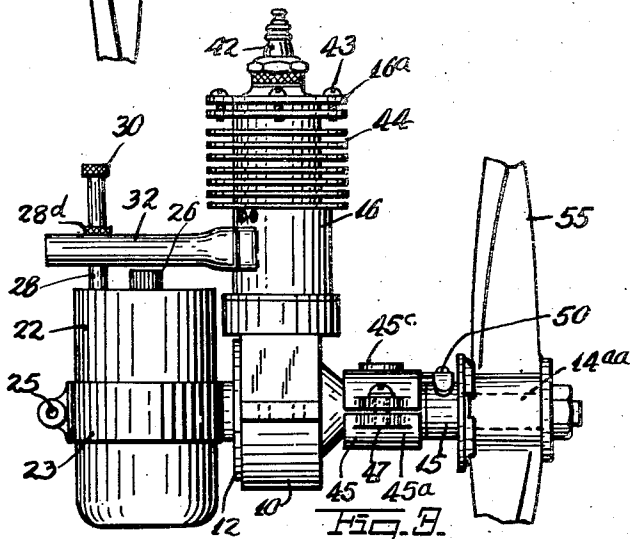


Fig. 3.

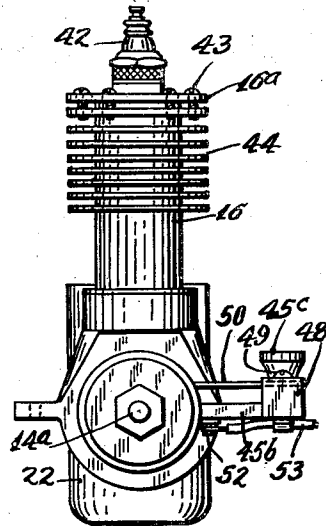


Fig. 4.

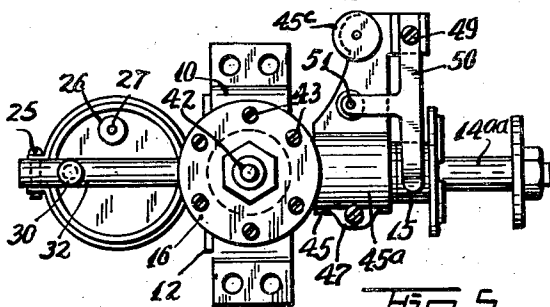


Fig. 5.

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TOY AIRPLANE MOTOR

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3 Claims. (Cl. 123—73)

This invention relates to new and useful improvements in a toy airplane motor.

The invention has for an object the construction of a toy airplane motor adapted to be operated by gasoline or similar fuels and constructed in an extremely simple manner.

More specifically, the invention proposes to characterize the toy airplane motor by an air tight crankcase having a tubular member on one side through which the crank shaft is rotatively supported, and an arrangement whereby the incoming fuel is sucked into the crankcase to be better carbureted.

The invention also proposes a carburetor comprising an air intake tube through which a fuel tube controlled by a needle nozzle is passed to supply air and fuel to a port formed in the side of a cylinder for the motor.

Still further the invention contemplates arranging the cylinder of the motor in a particular manner and associating it with the crankcase and carburetor device in an extremely simple fashion.

Still further the invention contemplates the provision of a novel make and break arranged in a manner so that the ignition spark may be advanced and retarded in an extremely simple way.

For further comprehension of the invention, and of the objects and advantages thereof, reference will be had to the following description and accompanying drawings, and to the appended claims in which the various novel features of the invention are more particularly set forth.

In the accompanying drawings forming a material part of this disclosure:

Fig. 1 is a side elevational view of a toy airplane motor constructed in accordance with this invention.

Fig. 2 is an end elevational view looking from the right hand end of Fig. 1.

Fig. 3 is a rear elevational view of Fig. 1.

Fig. 4 is an end elevational view looking from the left hand end of Fig. 1 with the propeller removed.

Fig. 5 is a plan view of Fig. 3.

Fig. 6 is a fragmentary enlarged transverse vertical sectional view of a portion of Fig. 1.

Fig. 7 is a fragmentary vertical sectional view taken on the line 7—7 of Fig. 6.

Fig. 8 is a fragmentary horizontal sectional view taken on the line 8—8 of Fig. 6.

Fig. 9 is a transverse vertical sectional view taken on the line 9—9 of Fig. 1.

Fig. 10 is a side elevational view of the crank shaft.

Fig. 11 is an enlarged detail view of a portion of Fig. 6.

The toy airplane motor, according to this invention, includes an air-tight crankcase 10 having a tubular member 11 on one side. The other side of the crankcase is closed with a plug 12 which is threadedly engaged in position. The tubular member 11 is provided with an "Oilite" oil cushion bearing bushing 13. A crank shaft 14 is rotatively engaged through the tubular member 11 and its bushing 13. This crank shaft comprises a shaft proper 14^a having a disc portion 14^b mounted on its inner end. This disc portion is cut out at the two sides 14^c so as to counterbalance the piston rod and piston during operation of the motor.

A cam 15 is mounted on an outer portion of the crank shaft 14 immediately adjacent the outer end of the tubular member 11 on a tapered portion 14^{bb} of the crank shaft. This tapered portion is formed to maintain the compression and vacuum in the crankcase 10, also to permit the setting of the cam in various desired positions, and by so doing the timer, which will be described hereinafter, may also be used in various set positions, such as in the horizontal or vertical positions. A cylinder 16 is mounted on the crankcase 10. The adjacent portions of these parts, cylinder and crankcase, are formed with threads 17 by which they are connected. The cylinder 16 has a bottom opening 18 connecting the interiors of the cylinder and crankcase together. A hollow piston 19 is disposed within the cylinder 16 and is associated with a connecting rod 20 connected thereto with a pin 21'. This pin is prevented from sliding by a pair of piston pin keys 21^b, snapped into suitable openings in pin 21', at the ends of the pin, adjacent the inner wall of the hollow piston 19. The lower end of rod 20 is connected to an eccentric pin 21 mounted on the disc 14^b. This pin 21 is surrounded by a flanged brass bearing 20^a which is held in position by a split washer or rod key 21^c which is adapted to engage and anchor in an annular groove 21^a in the eccentric pin 21. This bearing prevents the wear of the connecting rod 20 and pin 21, and may be interchanged whenever desired without removing the entire piston 19 from the cylinder 16.

A small fuel tank 22 is supported by a metallic band 23 secured to the plug 12 by a fastening element 24. The band 23 has its outer end split open, and the end portions thereof are connect-

ed together with a screw 25. This screw may be tightened to make the band grip the tank 22, or may be loosened to release the tank.

The top wall of the tank 22 is provided with a removable plug 26, which when removed discloses an opening through which the tank may be supplied with fuel. This plug has a very small vent opening 27 permitting the passage of air into the fuel tank as gasoline, or the fuel is used up.

A fuel discharge pipe 28 extends into the tank through its top wall and terminates near the bottom of the tank. The discharge pipe 28 is secured to the top 22' of the tank 22 by engaging the threaded opening 22^a by the threaded portion 28' of the pipe 28. The pipe 28 is formed with a flange 28^b, which engages over the top 22' of the tank 22. A gasket 28^c is interposed between the flange 28^b and the tank top 22' to prevent evaporation of the fluid stored in the tank. Another nut 28^d is adapted to engage a threaded extension 28^e of the pipe 28, and by means of this nut, the pipe 28 is secured to the inlet pipe 32. The outer end of this pipe 28 is formed with a reduced portion 28^a which has a nozzle opening 29. A bushing 30 is threadably engaged on the reduced end 28^a and is provided with a needle valve 31 operating across the nozzle opening 29 for controlling the passage of fuel.

An air inlet pipe 32 has an open outer end 32^a and has a central portion through which the reduced end 28^a of the fuel pipe 28 passes. This air inlet pipe 32 connects with fuel inlet ports 33 formed in the side wall of the cylinder 16. These ports 33 are located at a point just beneath the piston 19 when the latter is in its outer position.

The cylinder 16 has a jacket 34 attached on one side dividing off an enclosed passage 35. This passage 35 connects with bottom ports 36 adapted to align with ports 37 formed in the piston 19, when the piston is in its inner position. The passage 35 also has top ports 38 which are just above the top of the piston 19 when the piston is in its inner position.

A spark plug 42 is mounted on the outer end of the cylinder 16. The cylinder 16 has a removable head 16^a which is held in position by several fastening elements 43. The upper portion of the cylinder 16 is provided with a plurality of closely spaced fins 44 for air cooling purposes.

A bracket 45 is frictionally turnably mounted upon the tubular member 11 (see Figs. 1 and 6). This bracket 45 has an annular bottom portion 45^a which is formed with an open split 46. A fastening element 47 engages through lug portions mounted upon or formed on the material adjacent this split 46. This fastening element 47 is in the form of a screw which may be turned in or slightly let out to control the frictional grip of the bracket upon the tubular member 11.

The bracket 45 is provided with an upwardly extending stem portion 45^b. At the top this stem portion is formed with a boss 48 into which a screw 49 threadably engages. The screw 49 supports a steel spring 50. This spring 50 carries a contact 51 of a make and break. This contact 51 is directly opposite a contact 52 which is mounted on the portion 45^a, offset to one side of spring 50 in a position where no oil can splash on these contact points. By this arrangement the contacts 51 and 52 are kept clean from the splashing oil and thus the timing of the spark becomes more dependable than other toy airplane

motors. The contact 52 is connected with a cable 53 for the ignition of the airplane motor.

The operation of the airplane motor is as follows:

The plug 26 is removed and fuel is placed in the tank 22. The plug is then replaced. The knob 45^c is gripped and the bracket 45 is turned so as to retard the spark. It should be noted that when the bracket 45 is turned on the tubular member 11, the end of the spring 50 will be changed relative to the location of the recess 15^a of the cam 15. The motor is now ready to be cranked.

The piston 19 during its upstroke will create suction in the cylinder 16, which will draw in air through the air tube 32. Fuel will also be drawn into this tube through the nozzle opening 29. The incoming fuel will enter beneath the piston 19 into the crankcase. Then the piston 19 moves downwards and this fuel will be forced into the crankcase 10. The fuel is being compressed beneath the piston 19. When the piston reaches its extreme lowered position the ports 36 and 37 align with each other and the compressed fuel is permitted to escape up through the passage 35 and through the ports 38 into the power cylinder to the top of the piston 19.

The piston 19 now starts moving upwards and closes the ports 38. The fuel is completely compressed in the cylinder above the piston. When the fuel is completely compressed and the piston starts moving downwards the spark plug 42 functions to ignite the fuel which then drives the piston downwards under power. When the piston uncovers the ports 40 the burned gases will discharge. The baffle 41 tends to prevent an excess loss of good fuel which enters the cylinder through the ports 38 and which must be restrained from freely discharging out of the ports 40.

After the motor starts running the handle 45^c is again gripped and the bracket 45 moved around on the tubular member 11 so as to advance the spark to increase the efficiency of the engine.

While I have illustrated and described the preferred embodiments of my invention, it is to be understood that I do not limit myself to the precise constructions herein disclosed and the right is reserved to all changes and modifications coming within the scope of the invention as defined in the appended claims.

Having thus described my invention, what I claim as new, and desire to secure by United States Letters Patent is:

1. In an airplane motor, an air-tight crankcase having a tubular member on one side, a crank shaft rotative through said tubular member and having a cam adjacent the outer end of said tubular member, a cylinder mounted on said crankcase and having its inner end connected with the interior of said crankcase, a hollow piston in said cylinder and having a connecting rod connecting it with said crank shaft, a small fuel tank mounted on said crankcase and having a fuel discharge pipe with a nozzle opening controlled with a needle valve, an air inlet pipe encasing that portion of the fuel discharge pipe having the nozzle opening and connecting with a fuel inlet port in the side of said cylinder at a point beneath said piston when the piston is in its outer position, said cylinder having a passage with a bottom port aligning with a port in said piston when the piston is in its inner position and having a top port just above the piston in its in-

ner position, said cylinder also having a burnt fuel discharge port just above said top port, and a baffle on the top of said piston for separating the latter ports, said mounting of said fuel tank comprising a band securely encircling said fuel tank, a plug closing the end of said crankcase opposed to said tubular member, and screw passing freely through an opening in said band and threadedly engaging an opening in said plug, said screw having its head sunk so as to be flush with the inside periphery of said band.

2. In an airplane motor, an air-tight crankcase having a tubular member on one side, a crank shaft rotative through said tubular member and having a cam adjacent the outer end of said tubular member, a cylinder mounted on said crankcase and having its inner end connected with the interior of said crankcase, a hollow piston in said cylinder and having a connecting rod connecting it with said crank shaft, a small fuel tank mounted on said crankcase and having a fuel discharge pipe with a nozzle opening controlled with a needle valve, an air inlet pipe encasing that portion of the fuel discharge pipe having the nozzle opening and connecting with a fuel inlet port in the side of said cylinder at a point beneath said piston when the piston is in its outer position, said cylinder having a passage with a bottom port aligning with a port in said piston when the piston is in its inner position and having a top port just above the piston in its inner position, said cylinder also having a burnt fuel discharge port just above said top port, and a baffle on the

top of said piston for separating the latter ports, said crankcase being provided with a plug on the side opposite said tubular member.

3. In an airplane motor, an air-tight crankcase having a tubular member on one side, a crank shaft rotative through said tubular member and having a cam adjacent the outer end of said tubular member, a cylinder mounted on said crankcase and having its inner end connected with the interior of said crankcase, a hollow piston in said cylinder and having a connecting rod connecting it with said crank shaft, a small fuel tank mounted on said crankcase and having a fuel discharge pipe with a nozzle opening controlled with a needle valve, an air inlet pipe encasing that portion of the fuel discharge pipe having the nozzle opening and connecting with a fuel inlet port in the side of said cylinder at a point beneath said piston when the piston is in its outer position, said cylinder having a passage with a bottom port aligning with a port in said piston when the piston is in its inner position and having a top port just above the piston in its inner position, said cylinder also having a burnt fuel discharge port just above said top port, and a baffle on the top of said piston for separating the latter ports, said crankcase being provided with a plug on the side opposite said tubular member, said fuel tank being supported by a band mounted on said plug, said band having a split portion frictionally closed with a fastening element.

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