

Elementary Engine Mechanism.

The many adaptations that have been made of engine power to farm use, and the degree of reliability to which these engines have been perfected, have resulted in general interest and a widening use of this form of power on the farm. To familiarize our readers with the principles of engine mechanism, we give here the gist of Bulletin 277, United States Department of Agriculture, which treats of this subject:

Every exploding engine operating with crude oil or its distillates, or alcohol, must have certain parts, no matter how

the name four-stroke cycle or four cycle is given. There are certain other engines with different valve arrangements, which may complete a series of operations in two strokes, and these are called two-cycle engines.

The series of operations requiring four strokes is best illustrated by a set of diagrams. In figures 1 to 4 is shown a cylinder with the parts connected to it. On the first stroke or outstroke (fig. 1) the piston is drawn forward either by hand when starting or by the action of fly wheels after the engine is put in

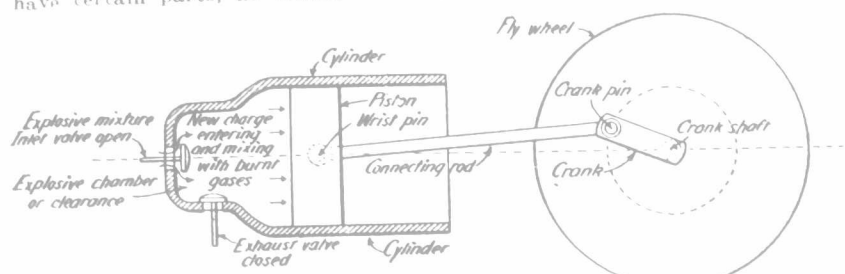


FIG. 1—THE FIRST STROKE: SHOWING POSITION OF VALVES WHEN PISTON IS DRAWN BACK ON THE FIRST STROKE AND ENTRANCE OF EXPLOSIVE.

different engines may vary in other details. These parts are a cylinder in which a sliding plug or piston works back and forth, carrying a pin called the wrist pin, to which is fastened a connecting rod, the other end of which fits in another pin called a crank pin. This crank pin is at one end of an arm called the crank, on the other end of which is the shaft or crank shaft. The piston moves back and forth in the cylinder, but

This moving forward of the piston is accompanied by an opening of the inlet valve, permitting the explosive mixture to follow the piston and fill the cylinder. The clearance space, before this suction stroke begins, is filled with burnt gases from the previous explosion, so that the amount of mixture drawn in will be equal to the volume displaced by the piston, and this fresh mixture will be mixed with some burnt gases. At the

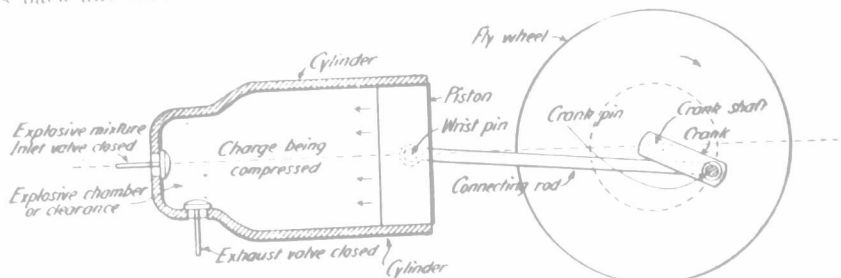


FIG. 2—SECOND STROKE: THE EXPLOSIVE BEING COMPRESSED WITH ALL VALVES CLOSED.

when nearest the cylinder head there is still some space left between the walls, valves and the piston head. This space is called the clearance, or the explosion chamber, and is the space in which the charge is compressed before it is exploded. In the clearance walls or cylinder head there are two valves in the form of disks, which cover the openings or ports. Through one of the valves an explosive mixture, having certain char-

acteristics to be explained later, is admitted from the source of fuel supply and from the air. Through the other valve the products of combustion after an explosion are expelled. Their duty gives these valves the names of inlet and exhaust valves, respectively. Four strokes are usually required to complete the cycle of events occurring within the cylinder, and to engines requiring these four strokes

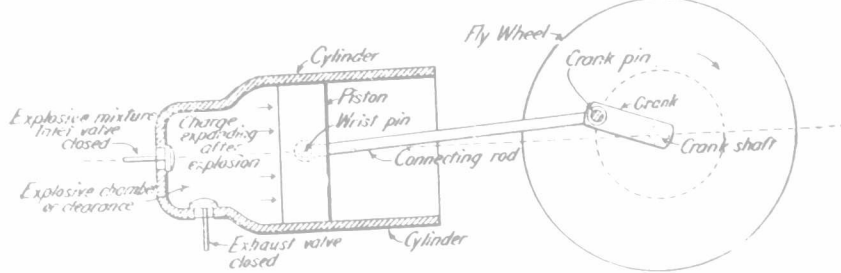


FIG. 3—WORKING STROKE: THE GASES HAVE BEEN FIRED BY AN ELECTRIC SPARK WHEN COMPRESSED IN THE FORWARD END OF THE CYLINDER, AND THE FORCE OF EXPANSION DRIVES THE PISTON BACK.

causing the pressure to rise two to four and one-half times the compression pressure. This high pressure in the clearance space will then drive the piston forward. This stroke, the third, or outstroke (fig. 3), is accomplished by the high pressure of the gases filling the explosion chamber, and during the progress of the piston the pressure gradually falls as expansion takes place. During this

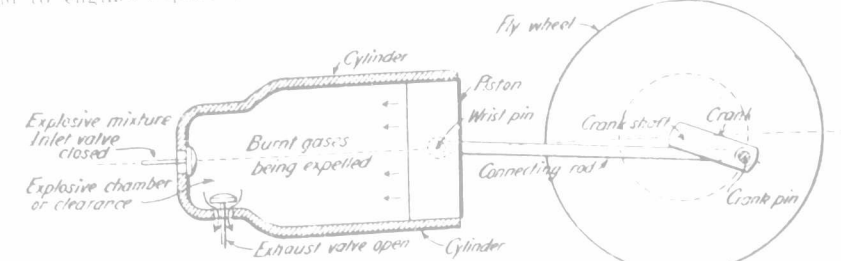


FIG. 4—CLEARANCE STROKE: THE PISTON RETURNING TO DRIVE OUT THE BURNT GASES—VALVES OPEN.

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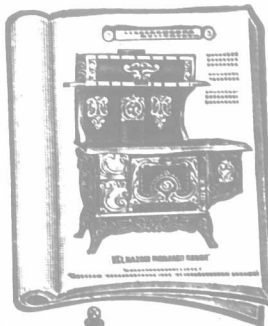
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