

stroke, when the crank shaft will be on "dead center" shove the timer lever back toward the cylinder as far as it will go on the 2 $\frac{1}{2}$ , 4 and 6 H. P. when contact should just be made.

On the 1 $\frac{1}{2}$  and 1 $\frac{3}{4}$  which has no spark advance lever, the contact will be made when the piston is on its farthest compression instroke and the crank shaft is nearly up to "dead center."

### TO PROVE THE SETTING OF THE EXHAUST VALVE.

In setting the Exhaust valve, turn the fly-wheel around until the piston is at the end of the forward stroke; the throw of the crank-shaft is then forward. Next turn the fly-wheel backwards until the Exhaust valve just begins to open; the underside of the cam is then touching the roller and the point of adjusting screw on Exhaust lever is touching the valve stem (if this screw is in too far, valve will not seat.)

Next turn the fly-wheel forward until the piston is at the end of the Exhaust or return stroke. You will find that the upper side of the Cam is just leaving the roller and the Exhaust valve is closing.

Note: The exhaust valve should close when the engine starts to make the forward power stroke, at which point the roller will just begin to leave the cam on its upper side. It is important that the exhaust closes exactly on center. Otherwise, the suction stroke will begin too late to put in the fresh charge of fuel.

Should it ever be found necessary to remove the gear with cam attached, be sure to prick-punch or otherwise mark the tooth on this gear as well as the one on crank shaft, so that they will go back together as originally sent out.

### POINTERS.

**POUNDRG**—Caused by loose connecting rod or loose key in fly-wheel or spark lever advanced too far under full load.

**HOT BEARINGS**—Not enough lubricant or bearings too tight.

**BACK FIRING**—Not enough gasoline, or leaking intake valve.

**BLACK SMOKE FROM MUFFLER**—Too much gasoline.

**LOSS OF POWER**—Spark lever advanced too far which will also cause engine to pound. Air, shut off too much. Needle valve on mixer opened too much. Gasoline too low in tank causing engine to miss.

**IRREGULAR SPEED**—Governor hooks fitted too closely (can be ground off to give more clearance), or worn down too much; also the governor lever, where the weight strikes, may be too far out of the path of the weight, due to its having become bent. Or the spring that holds this lever away from the bell crank may be too tight or too loose.

In addition to this, the governor weight may be too tight on the pin, or the spring which holds the lower lever back may be too stiff.