Dec. 3, 1929. C. MUZYN 1,737,726

ENGINE TIMING GAUGE

Filed March 21, 1927

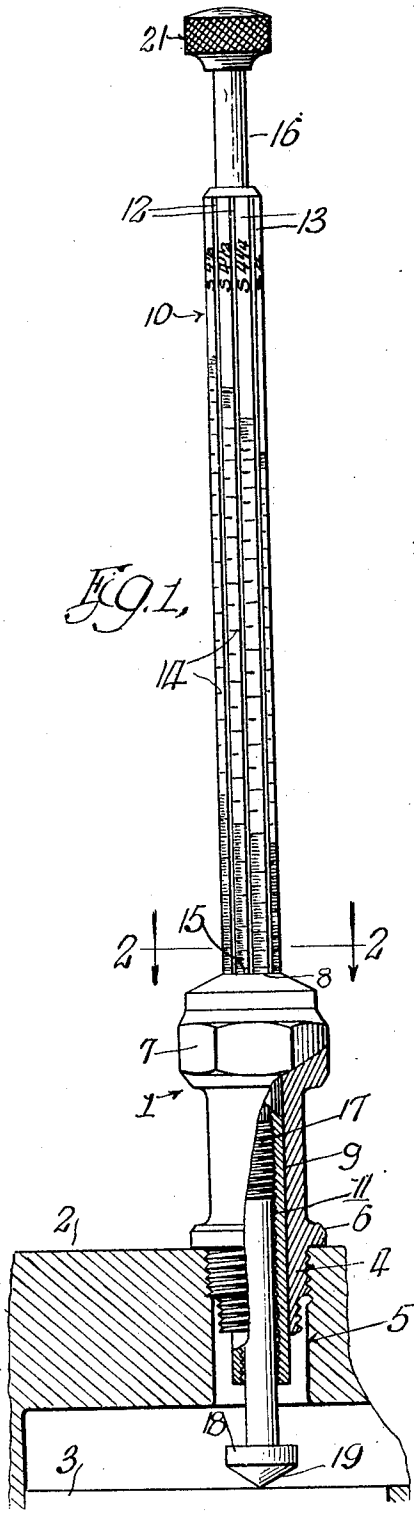

Fig. 1.

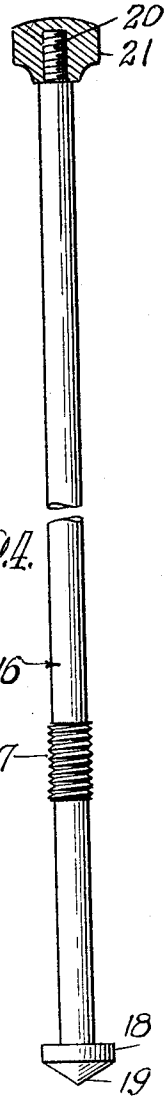

Fig. 4.

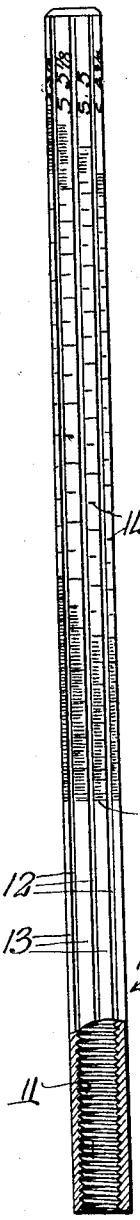

Fig. 3.

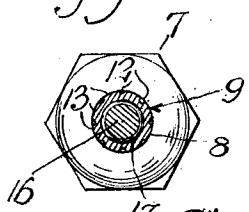

Fig. 2.

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UNITED STATES PATENT OFFICE

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ENGINE TIMING GAUGE

Application filed March 21, 1927. Serial No. 176,935.

This invention relates to improvements in engine timing gauges, and it consists of the matters hereinafter described and more fully pointed out in the appended claims.

One of the objects of the present invention is to provide a gauge of this kind of simple construction whereby the opening and closing of the valves of an engine may be easily and accurately timed with respect to the position of the associated piston in its cylinder.

A further object of the invention is to provide a gauge of this kind which may be employed in connection with any one of a number of engines having piston strokes of different lengths and which may be easily manipulated for its intended purpose.

Still another object of the invention is to provide a gauge of this kind whereby the unknown piston stroke of an engine may be readily found out and the valves thereof timed in relation to said piston.

Still another object of the invention is to provide such a device which may be secured into a spark plug or similar opening for attachment to the cylinder of the engine, the valves of which it is desired to time with respect to the position of the piston.

These objects of the invention as well as others together with the many advantages thereof, will more fully appear as I proceed with my specification.

In the drawings:

Fig. 1 is a view in side elevation of the preferred form of my improved engine timing gauge.

Fig. 2 is a horizontal sectional view through the same as taken on the line 2—2 of Fig. 1.

Fig. 3 is a view partly in elevation and partly in section of a calibrated tube embodied in my improved gauge.

Fig. 4 is a view in elevation of a piston engaging rod embodied in my improved gauge.

Referring now in detail to that embodiment of the invention illustrated in the accompanying drawing, 1 indicates a plug like member forming the means by which the gauge as a whole is operatively attached to an engine cylinder head 2, the associated valves of which it is desired to time with respect to the position of the piston 3 therein. Said member 1 which is tubular includes a body portion having its bottom end formed to provide a threaded part 4 to be screwed into a spark plug opening 5 in the cylinder head. As some engines employ metric threads and some standard threads in said opening, said bottom end of the member is duplex so as to be capable of use with either type of thread. On said body above the threaded part 4 is a flange 6 which in engines having spark plug openings with standard threads, will engage the top of the cylinder head when properly screwed therein. The top end of said body is made hexagonal as at 7 to receive a wrench and above this hexagonal part, said body is tapered to provide a reading edge 8.

In the bore 9 of said member 1 is arranged a tubular gauge rod 10, the same so fitting the bore 9 as to be longitudinally movable therein, as well as rotatable, but without lateral play between the two. The bottom end of said gauge rod is interiorly threaded as at 11 for a purpose to appear later. On the exterior of said gauge rod is formed a plurality of equally spaced, longitudinally extending grooves 12—12 which divide the gauge rod into a plurality of faces 13—13. Each face is calibrated with suitable division or graduation marks as indicated at 14, all starting from a common horizontal plane or line indicated at 15, which line is located a short distance above the termination of the threads 11. As engines of different makes usually employ piston strokes of different lengths, say from four inches up to five and one half inches, and which are recognized as standard, I have calibrated each face for a length corresponding to one of said standardized strokes and each stroke is designated at the top of the respective face by a numeral. It is pointed out that the calibrations do not indicate fractions of lineal measurements such as eighth and quarter inches but indicate projections equal to vertical spacings, of divisions each measured off, ten degrees apart on the crank pin circle of engines of the respective strokes. Thus the calibrations

are spaced closer together at the ends of each set of calibrations and further apart midway between said ends as will be apparent. Furthermore the calibrations at the ends of each length are further calibrated to indicate divisions less than ten degrees on the crank pin circle.

In said calibrated tube is a rod 16 which for convenience I have termed a piston engaging rod for reasons later to appear. Said rod which is of a length greater than the calibrated tube, is of a diameter smaller than the same and at a point spaced a suitable distance above its bottom end is provided with a length of thread 17 to engage the thread 11 of the tube. The bottom end of the rod has a radial flange 18 of a diameter approximating the outside diameter of the tube and said flange terminates in a point 19. The top end 20 of said rod is reduced in diameter and has fixed thereto a knob 21 by which it is manipulated, the knob being fixed to said rod after its insertion into the tube.

Assume that the rod has been assembled in the tube and the tube has been inserted in the plug member 1 and it is desired to time the valves of an engine having a known piston stroke of say five inches for example. The plug member is screwed into the spark plug opening 5 in the cylinder head and the engine is slowly turned over to bring the piston to the top of its stroke. When this position of the piston has been approximated the tube is moved downwardly through the plug member to bring the common line 15 of calibration into the plane of the reading edge 8. The tube is then held against rotation and the knob 21 on the rod is turned clockwise to feed the rod downwardly the point 19 penetrating such carbon deposit on the piston as may have accumulated thereon whereby it is felt when good positive engagement has been made with the piston. By slightly rocking the engine crank to which the piston is connected the rod and tube will rise and fall with the piston and if the common line 15 of calibration on the tube is raised above the reading edge, this will indicate that the tube is not as yet properly adjusted for a correct reading. The rod 16 is then turned counter clockwise until the common line 15 registers with the reading edge. When the angular position of the crank pin from top center is known for the proper opening of the inlet valves, the crank shaft is turned to move the piston downwardly that distance which is readily readable upwardly on that face on the gauge tube corresponding with the piston stroke. Likewise to determine when the inlet valve should close, the piston is first moved to the bottom of its stroke and then the top most line of calibration on said face for that piston stroke should register with the reading edge on the plug member. When the angular portion of the crank pin from bottom center is known for the proper closing of the inlet valve it is only necessary to turn the crank shaft so that it moves upwardly until the proper calibration on said face (reading downwardly) registers with said reading edge. With the known angular positions of the crank pin for the proper opening and closing of the exhaust valves, these positions may be determined in a similar manner of manipulation readily apparent.

Assume that the piston stroke of a motor is not known. Under such a condition, the said stroke must be first ascertained before the valve timing may be determined. To this end the piston is brought to the top of its stroke and the rod 16 is turned in the proper direction (the tube being held against rotation) to bring the common reading line into registration with the reading edge on the plug member. The piston is then moved to the bottom of the stroke, thus bringing one of the top most calibrations on the tube into registration with said reading edge which reading will of course correspond to the piston stroke. With the piston stroke thus known, the crank pin circle becomes known and it is an easy matter to set the same in the desired position for the opening and closing of the valves, in the manner heretofore described.

The device as illustrated herein is for the purpose of operation in the usual spark plug opening, but as is apparent it may so far as its principle is concerned also operate in such other holes in the cylinder where it is possible to engage the piston as described.

The device is simple in construction and employs no springs or other delicate parts which can readily get out of order. It is positive and accurate and is capable of easy manipulation.

While in describing my invention I have referred to many details of construction as well as form and arrangement of the parts thereof, the same is to be considered as by way of illustration only so that I do not wish to be limited thereto except as may be pointed out in the appended claims.

I claim as my invention:

1. A device of the kind described comprising a supporting member adapted to be threaded into a hole in a cylinder head above a piston and having an opening therethrough, a gauge member longitudinally movable through the opening in said member and having at least one set of calibrations, thereon, said supporting member having a part with which said calibrations may be associated in the movement of the gauge member through said supporting member and a piston engaging rod disposed in said gauge member and of a length greater than the same so as to project beyond the ends thereof, said rod and gauge member having engaging parts permitting a relative longitudinal adjustment between them.

2. A device of the kind described comprising a supporting member having an opening therethrough, a gauge member longitudinally movable through the opening in said supporting member and provided with a plurality of sets of calibrations thereon, graduated to indicate spaced angular positions on crank pin circles of different diameters, all of said sets of calibrations beginning at a common line, said supporting member having a part with which any set of calibrations may be associated in the movement of the gauge member through the supporting member.

3. A device of the kind described comprising a supporting member having an opening therethrough, a gauge member longitudinally movable through the opening in said supporting member and provided with a plurality of sets of calibrations thereon, graduated to indicate spaced angular positions on crank pin circles of different diameters, all of said sets of calibrations beginning at a common line, said supporting member having a bevelled part, at its top end providing a reading edge with which any set of calibrations may be associated in the movement of the gauge member through the supporting member.

4. A device of the kind described comprising a tubular supporting member, a gauge tube longitudinally movable therethrough and having a plurality of faces each with a set of calibrations thereon differing one from the other, but all starting at a common line, means providing a reading edge on said supporting member and with which any set of calibrations may be associated, and a piston engaging member carried by said gauge tube and having parts normally projecting beyond each end of the same, said gauge tube and piston engaging member having interengaging parts providing a relative longitudinal adjustment between them.

5. A device of the kind described comprising a tubular supporting member screw threaded at one end and tapered at its other end to form a reading edge, said member being of a rectangular cross section between its ends for the application of a wrench, a gauge member movable longitudinally through said supporting member and longitudinally grooved to provide a plurality of faces each differently calibrated, said calibrations all starting from a common line, and a piston engaging member carried by the gauge tube, said gauge member and piston engaging member having interengaging parts providing a relative longitudinal adjustment between them.

6. A device of the kind described comprising a tubular supporting member screw threaded at one end and tapered at its other end to form a reading edge, said member being of a rectangular cross section between its ends for the application of a wrench, a gauge member movable longitudinally through said supporting member and longitudinally grooved to provide a plurality of faces each differently calibrated, said calibrations all starting from a common line, and said gauge tube being interiorly threaded for a portion of its length, a piston engaging member in said tube and having a screw threaded connection therewith and projecting beyond each end thereof, said piston engaging member being pointed at one end and having a manipulating knob on the other end.

In testimony whereof, I have hereunto set my hand, this 16th day of March, 1927.

CLEMENS MUZYN.