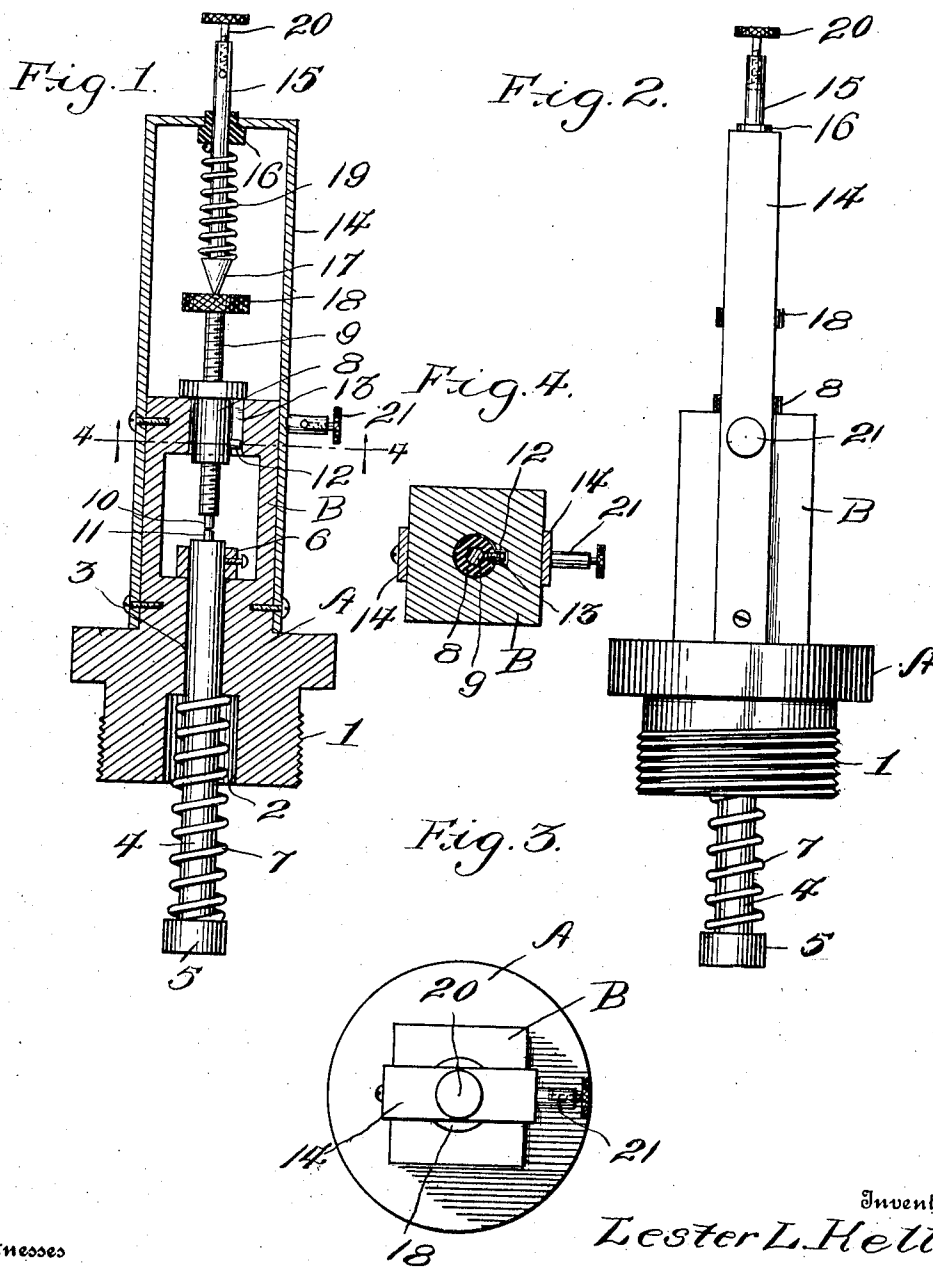


No. 895,645.

PATENTED AUG. 11, 1908.

L. L. KELL.
VALVE TIMING DEVICE FOR EXPLOSIVE ENGINES.
APPLICATION FILED DEC. 17, 1907.



Witnesses

J. T. Wright,
C. Bradway,

Inventor
Lester L. Kell,

By Victor J. Evans
Attorney

UNITED STATES PATENT OFFICE.

LESTER L. KELL, OF ST. LOUIS, MISSOURI.

VALVE-TIMING DEVICE FOR EXPLOSIVE-ENGINES.

No. 895,645.

Specification of Letters Patent.

Patented Aug. 11, 1908.

Application filed December 17, 1907. Serial No. 406,903.

To all whom it may concern:

Be it known that I, LESTER L. KELL, a citizen of the United States, residing at St. Louis, in the county of St. Louis City and State of Missouri, have invented new and useful Improvements in Valve-Timing Devices for Explosive-Engines, of which the following is a specification.

In the operation of explosive engines of that type having mechanically actuated valves, it is highly essential, in order to obtain the best operating conditions and the maximum output of the engine, that the valves be opened and closed at predetermined intervals. It is necessary from time to time to re-adjust the valves, as for instance, after the valves or valve seats have been ground. To enable the timing of the valves to be accomplished, the manufacturers usually provide marks on the fly wheel which are adapted to register with marks or indexes arranged on a fixed part of the engine to indicate the position of the fly wheel when the valves should open and close. In timing the valve in the manner contemplated, it is usually necessary to employ the services of two persons, one to turn the fly wheel to ascertain when the marks or indexes register at the opening or closing of the valve, and the other to ascertain when the valve opens or closes, as for instance, by placing a screw-driver or other instrument through the plug opening over the valve to feel the valve move. When such second person feels the valve open, he informs the other person to stop the fly wheel and then the valve is adjusted with the aim to set it so as to open or close at the proper interval. After this adjustment of the valve, the trial is repeated one or more times until the proper adjustment is effected. This method, while being objectionable in requiring two persons, is more or less tedious and unreliable, as it is difficult to obtain the proper adjustment.

The principal object of the present invention is to overcome these difficulties by providing a device whereby one person can easily and accurately adjust the valves to bring them in proper timed relation to the movement of the crank shaft and pistons, the opening and closing of the valves being ascertained through a suitable signaling device.

A further object of the invention is to provide a device of the character referred to

which can be readily applied to the engine in such a position that the instant the valve to be adjusted opens or closes, a signal-including circuit will be closed or opened, thus informing the attendant of these facts while he is stationed at the fly wheel for turning the same. By stopping the fly wheel at the time the signal is energized, the relation of the opening of the valve to the position of the fly wheel can be determined and the valve adjusted accordingly. After one or more trials in this manner, the proper adjustment can be accomplished.

Another object of the invention is the provision of a circuit-closing device which is adapted to be inserted in the usual valved plug opening disposed over the valve, the device including a spring-pressed element or follower adapted to bear on the valve so as to be moved thereby and close or open a signal-including circuit.

A still further object of the invention is to provide a device of this character of comparatively simple and inexpensive construction, composed of few parts, readily manipulated, and efficient in operation.

With these objects in view and others, as will appear as the description proceeds, the invention comprises the various novel features of construction and arrangement of parts which will be more fully described hereinafter and set forth with particularity in the claims appended hereto.

In the accompanying drawing, which illustrates one of the embodiments of the invention, Figure 1 is a central vertical section of the device. Fig. 2 is a side view thereof. Fig. 3 is a plan view. Fig. 4 is a transverse section on line 4—4 of Fig. 1.

Referring to the drawing, A designates the body of the device which is in the form of a plug that is adapted to be inserted in the usual plug-receiving opening located over the valves of an explosive engine and this body can be secured in position in any suitable manner, as for instance, by means of threads 1 which are adapted to engage the threads of the valved plug-receiving opening of the engine. The body A has a chamber 2 and a vertical bore 3 communicating with the inner end of the chamber, and passing through the bore is a follower or element 4 that has a head 5 at its lower end and a removable collar 6 at its upper end which serves to prevent the element 4 from dropping out of the body. On the element 4 is a compression spring 7

which bears at its lower end on the head 5 and at its upper end on the inner wall of the chamber 2, whereby the element is urged downwardly with the collar 6 in contact with the body A. This element projects into the cylinder or valve chamber of the engine and is adapted to bear on the top surface of the valve to be timed. Since the element is spring-pressed, it can accommodate itself to the valve and yield upwardly as the body or plug A is screwed into position. The body A has an extension B in which is mounted a slidable bushing 8 of insulation, and threaded in the bushing is a metallic thumb screw 9 that has at its lower end a contact point or electrode 10 that is adapted to cooperate with the contact point or electrode 11 to open or close an electric circuit. The bushing 8 is freely movable with the screw 9 in a vertical direction but is prevented from turning by a pin 12 which engages in a slot 13 in the extension B so that the bushing will not turn with the screw 9 when the latter is adjusted. On the extension B is a frame 14 that carries a spring-pressed member 15 that is guided in a bushing 16 on the said frame. The lower end of the member 15 terminates in a cone 17 that has a point contact with the center of the head 18 of the screw 9 and disposed between the cone or head 17 and bushing 16 is a compression spring 19 that urges the metallic member 15 downwardly so as to be permanently in contact with the screw. By this means, the screw can be readily adjusted while the member 15 is in contact therewith so that a conducting path will be maintained through them. The member 15 is insulated from the frame 14 and the screw 9 is insulated from the body A, and one side of an electric circuit is adapted to be connected with the member 15 by the binding screw 20, and the circuit may include a bell, an incandescent lamp or a telegraphic sounder or the like, and the other side of the circuit is connected with the binding post 21 which is grounded on the body A with which the valve-actuated element 4 contacts.

In practice, the body A is adjusted to the engine after first removing the plug located over the valve to be timed. The head 5 bears against the valve and the element 4 yields upwardly as the body is screwed home. This upward movement of the element carries with it the contact screw 9 and member 15. The screw 9 is next moved upwardly so as to separate the contact points 10 and 11 and provide an open circuit, a slight turn of the screw 9 being sufficient to create a gap between the contact points. The circuit is then closed by a suitable switch and the fly wheel turned in order to ascertain the relation of the movement of the valve to the fly wheel. The instant the valve opens, the member 4 will be raised and thus bring the contact 11 into engagement with the con-

tact 10, with the effect that the signal device will be actuated. The position of the fly wheel at the time the valve opens is noted and as the movement of the fly wheel is continued, the element 4, screw 9, and member 15 will be raised until the valve is fully opened and after this point is reached, the said parts will lower until finally the closing of the valve takes place, whereupon the circuit is broken and the signaling device is de-energized. Thus the position of the fly wheel at the time of the closing of the valve is also ascertained. The operator then adjusts the valve in the usual manner to the position which he deems proper and another trial is made with the timing device. In this way, the operation of timing the valves can be easily and quickly accomplished and great accuracy obtained.

From the foregoing description, taken in connection with the accompanying drawing, the advantages of the construction and of the method of operation will be readily apparent to those skilled in the art to which the invention appertains, and while I have described the principle of operation of the invention, together with the apparatus which I now consider to be the best embodiment thereof, I desire to have it understood that the apparatus shown is merely illustrative, and that such changes may be made when desired as are within the scope of the claims. Having thus described the invention, what I claim is:—

1. In a device of the class described, the combination of a support, a longitudinally movable element on the support, a yielding means for holding the element in normal position, an adjustable member normally separated from the element and movable therewith, a member yieldingly engaging the adjustable member for holding the latter in normal position, means for connecting the second member to one side of a signal-including circuit, and means for connecting the element with the other side of such circuit.

2. In a device of the class described, the combination of a body, means for attaching the body to an engine, a spring-pressed element mounted on the body and arranged to bear on the valve to be timed, a screw disposed in line with the element and normally separated therefrom, a bushing arranged on the body and movably holding the screw, means operating on the screw for yieldingly holding the same to normal position, means for connecting the screw to a signal-including circuit, and means for connecting the element to such circuit.

3. In a device of the class described, the combination of a body adapted to be attached to an engine, a spring-pressed element arranged to be actuated by the valve to be timed, a movable bushing on the body, means

for preventing turning of the bushing, a screw in the bushing, contact points on the element and screw, a spring-pressed member in constant engagement with the screw, and means for connecting the screw and element in a signal-including circuit.

4. In a device of the class described, the combination of a supporting structure, a movable element thereon, said element having a conically pointed head, a screw adjustable with respect to the element, means for mounting the screw to move with the element, electrical contacts, and binding posts for connecting the screw and element with a signal-including circuit.

5. In a device of the class described, the combination of a supporting structure, means for mounting the same on an engine, a longitudinally-movable element on the

structure adapted to be moved by the valve to be timed, a screw arranged normally out of contact with the element and adjustable with respect thereto, a bushing held from turning on the structure and mounting the screw to move with the element, a member supported by and insulated from the structure and bearing on the screw, a spring urging the member in a direction to hold the screw in normal position, means for attaching the member to a signal-including circuit, and means for connecting the said structure to such circuit.

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

LESTER L. KELL.

Witnesses:

B. F. STORMENT,
THOS. S. KELL.