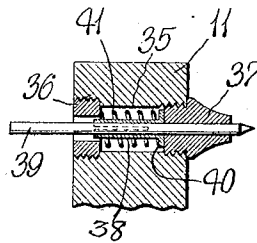
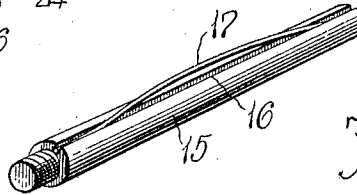
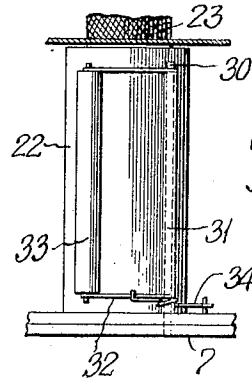
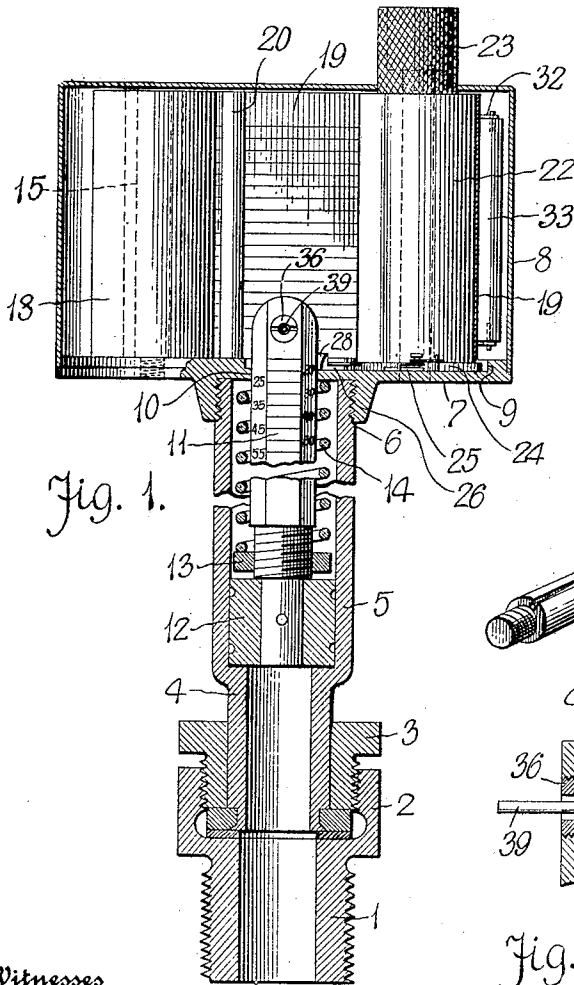
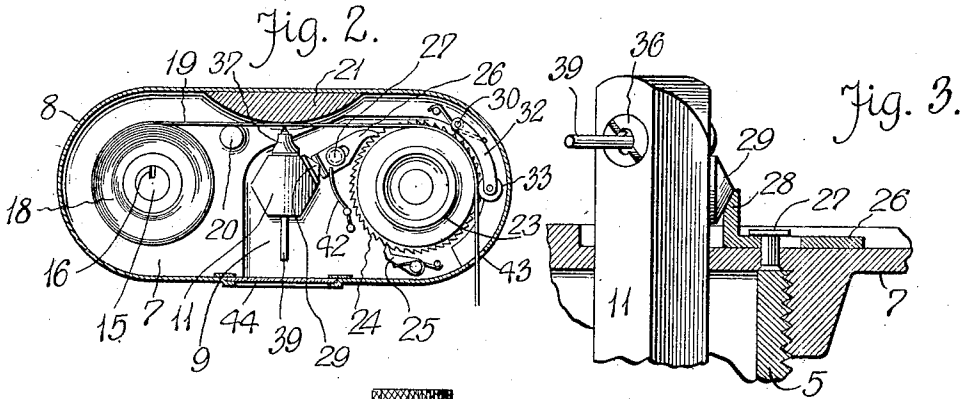


APPLICATION FILED MAR. 13, 1916.

Patented Jan. 15, 1918.



Witnesses

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Fig. 6. Charles E. Stevens, Jr.
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UNITED STATES PATENT OFFICE.

CHARLES E. STEVENS, JR., AND EDWARD W. STEVENS, OF DETROIT, MICHIGAN.

RECORDING-GAGE.

1,253,438.

Specification of Letters Patent.

Patented Jan. 15, 1918.

Application filed March 13, 1916. Serial No. 83,701.

To all whom it may concern:

Be it known that we, CHARLES E. STEVENS, Jr., and EDWARD W. STEVENS, citizens of the United States of America, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Recording-Gages, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to a recording compression gage for engines, particularly internal combustion or explosive engines, for ascertaining or maintaining a record of the pounds pressure of the compression or up-stroke of the pistons of the engine.

The primary object of our invention is to provide a novel recording instrument of the above type which may be temporarily substituted for the spark plug of a cylinder of a multi-cylinder engine to be actuated by air under compression to record or visibly indicate pounds compression within the engine cylinder, whereby a thorough test of the engine may be made, prior to using a flue, by operating the engine with a starter or other device.

Another object of our invention is to provide a recording instrument of the above type wherein a plunger or piston actuated ratchet mechanism is employed for intermittently moving a record sheet or apron in the path of a pencil or marking device which is reciprocated by the plunger or piston, to record in conjunction with graduations on the sheet or apron, pounds energy required to actuate the plunger, and this plunger is also graduated to visibly indicate such pounds energy independent of the record thereof.

A further object of our invention is to provide a recording gage of the above type wherein the parts are constructed with a view of reducing the cost of manufacture and at the same time retain features by which accuracy, safety, durability, and simplicity of construction are secured. With such ends in view our invention resides in the novel construction to be hereinafter described and then claimed.

Reference will now be had to the drawing, wherein—

Figure 1 is a vertical, longitudinal, sectional view of the recording gage;

Fig. 2 is a horizontal sectional view of the casing of the gage, illustrating parts of the gage in plan;

Fig. 3 is an enlarged detail sectional view of a portion of the gage, showing a portion of the plunger associated with a portion of the ratchet mechanism;

Fig. 4 is an elevation of a tension device in connection with a take up roll of the gage;

Fig. 5 is a perspective view of a detached roll spindle or post, and

Fig. 6 is an enlarged longitudinal sectional view of a pencil holder forming part of the plunger of the instrument.

In the drawing, 1 denotes a cylinder connection provided with a stuffing box 2 and a gland 3 for the lower reduced end 4 of a cylinder 5, said cylinder having the upper end thereof exteriorly screwthreaded as at 6.

Screwed upon the upper end of the cylinder 5 is the oblong base plate 7 of an instrument casing 8, said casing being detachable relative to the base plate. The top of the base plate, at one end thereof, is recessed, as at 9 and provided with a guide opening 10 in communication with the cylinder 5. The guide opening 10 is hexagonal in plan to receive a plunger 11 hexagonal in cross section to prevent such plunger from rotating in the base plate 7. The lower end of the plunger 11 is reduced to receive a piston head 12, and screwthreaded to receive a nut 13 employed for regulating the tension of a compression spring 14 encircling the plunger 11 between the base plate 7 and said nut. This coiled compression spring retains the piston head 12 normally in the lower end of the cylinder 5, and restores said piston head to such position after it has been elevated by compression within a cylinder.

Mounted in the base plate 7 at one end thereof, is the lower end of a supply roll spindle or post 15, grooved as at 16, to receive a tension spring 17 adapted to bear against the core or bobbin of a supply roll 18 loosely mounted upon the post or spindle 15. The supply roll 18 furnishes a ruled and graduated sheet or apron 19 adapted to pass behind a guide roller 20 carried by the base plate 7, and in front of a convex support or pad 21 within the casing 8.

The outer end of the sheet or apron is

adapted to be attached to a take up roll 22 journaled in the opposite end of the casing 8, this take up roll having the lower end thereof within the recess 9 and the upper end thereof provided with a finger piece protruding through the top of the casing 8, whereby the take up roll may be manually adjusted. The lower end of the take up roll 22 is provided with a ratchet wheel 24 and engaging said ratchet wheel is a spring pressed dog 25 mounted within the recess 9 and adapted to prevent a counter clockwise movement of the ratchet wheel 24. Engaging the ratchet wheel 24 is a pawl 26 longitudinally slotted to receive a pin 27 which slidably retains the pawl within the recess 9. The pawl 26 is employed for imparting a clockwise movement to the take up roll and the inner end of said pawl terminates in an upstanding beveled lug 28, as best shown in Fig. 3. This upstanding beveled lug is in the path of a conical cam member 29 carried by one of the facets of the plunger 11 contiguous to the upper end thereof. It is through the medium of this ratchet mechanism that the plunger 11 imparts an intermittent movement to the sheet or apron 19.

Associated with the take up roll 22 is a tension device adapted to cooperate with the spring 17 of the spindle or post 15 in retaining the sheet or apron 19 taut whereby it may be easily marked upon at the support or pad 21. The tension device comprises a post or upright 30 on the base plate 7 and loosely mounted upon said post is a sleeve 31 having radially disposed arms 32 supporting the pintles of a roller 33 adapted to bear against the periphery of the take up roll 22. One of the arms 32 is engaged by the end of a spring 34 located at the lower end of the post 30 and the tension of this spring is sufficient to maintain the roller 33 in engagement with the roll 22, yet permitting of the roller 33 yielding when the roll 22 is moved. The arms 32 are curved whereby the tension device can be readily located between the take up roll 22 and the walls of the casing 8.

The upper end of the plunger 11 is provided with a transverse opening 35 and mounted in one end of said opening is a nut 36 and mounted in the opposite end of the opening is a pencil holder 37, said pencil holder protruding from the plunger in the direction of the sheet or apron 19 in front of the support or pad 21. In the opening 35 of the plunger is a split sleeve 38 for a lead 39 or other marking instrumentality. The sleeve 38 has an end flange 40 and encircling said sleeve is a coiled compression spring 41, said spring yieldably holding the sleeve 38 and the lead 39 thereon, with the lead extending through the nut 36 and the holder 37. As the lead 39 is worn it may

be adjusted within the split sleeve 38 and it is preferable to adjust the lead within the sleeve whereby when the pointed end of the lead bears against the sheet or apron 19 the spring 21 will be under tension and consequently feed the lead outwardly as the same is worn.

Assuming that the connection 1 is substituted for the spark plug of a cylinder and that the engine is placed in operation or the crank shaft thereof turned over, the compression stroke within the engine cylinder forces the piston head 12 upwardly within the cylinder 5 and in consequence of this movement the lead 39 of the marking device indicates in conjunction with certain graduations upon the sheet or apron 19 the pounds pressure of the engine piston.

On the upstroke of the plunger 11, the conical cam 29 of said plunger is moved away from the upstanding beveled lug 28 of the pawl 26, consequently a spring 42 associated with said pawl can move the pawl to obtain a fresh grip upon the ratchet wheel 24. When the plunger 11 assumes normal position by reason of the spring 14 bearing upon the nut 13, the conical cam 29 impinges against the lug 28 of the pawl 26 and said pawl is shifted outwardly to partially rotate the take up roll 22, thereby shifting the sheet or apron 19 to present another space for the record of the next impulse of the engine.

In order that the pounds pressure of an engine piston may be observed independently of the record sheet, facets of the plunger 11 are calibrated, as shown in Fig. 1, and said calibrations may be observed through a transparent plate 44 forming a part of the casing 8.

The take up roll 22 permits of extensive compression pulsations of an engine being recorded and maintained, but in some instances, the casing 8 may be slotted, as at 43, whereby the sheet or apron 19 may pass out of the casing and be torn off to permit of a certain record of a particular engine cylinder being immediately obtained.

While in the drawing there is illustrated a preferred embodiment of our invention, it is to be understood that the structural elements are susceptible to such changes, in size, shape and manner of assemblage, as fall within the scope of the appended claim.

What we claim is:—

A recording gage comprising a cylinder adapted for attachment to an engine cylinder, a casing on said cylinder, a support at the back wall of said casing, a reciprocable plunger in said gage cylinder extending into said casing, feed and take up rolls in said casing at the sides of said plunger, a sheet carried by said rolls and engaging said support, a ratchet mechanism actuated by a downstroke of said plunger to move said

sheet, means in said gage cylinder to cause
a downstroke of said plunger, a marking de-
vice extending transversely of the upper
end of said plunger adapted to indicate on
5 said sheet each upstroke of said plunger,
and means in said plunger holding said
marking device.

In testimony whereof we affix our signa-
tures in presence of two witnesses.

CHARLES E. STEVENS, Jr.

EDWARD W. STEVENS.

Witnesses:

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,
Washington, D. C."