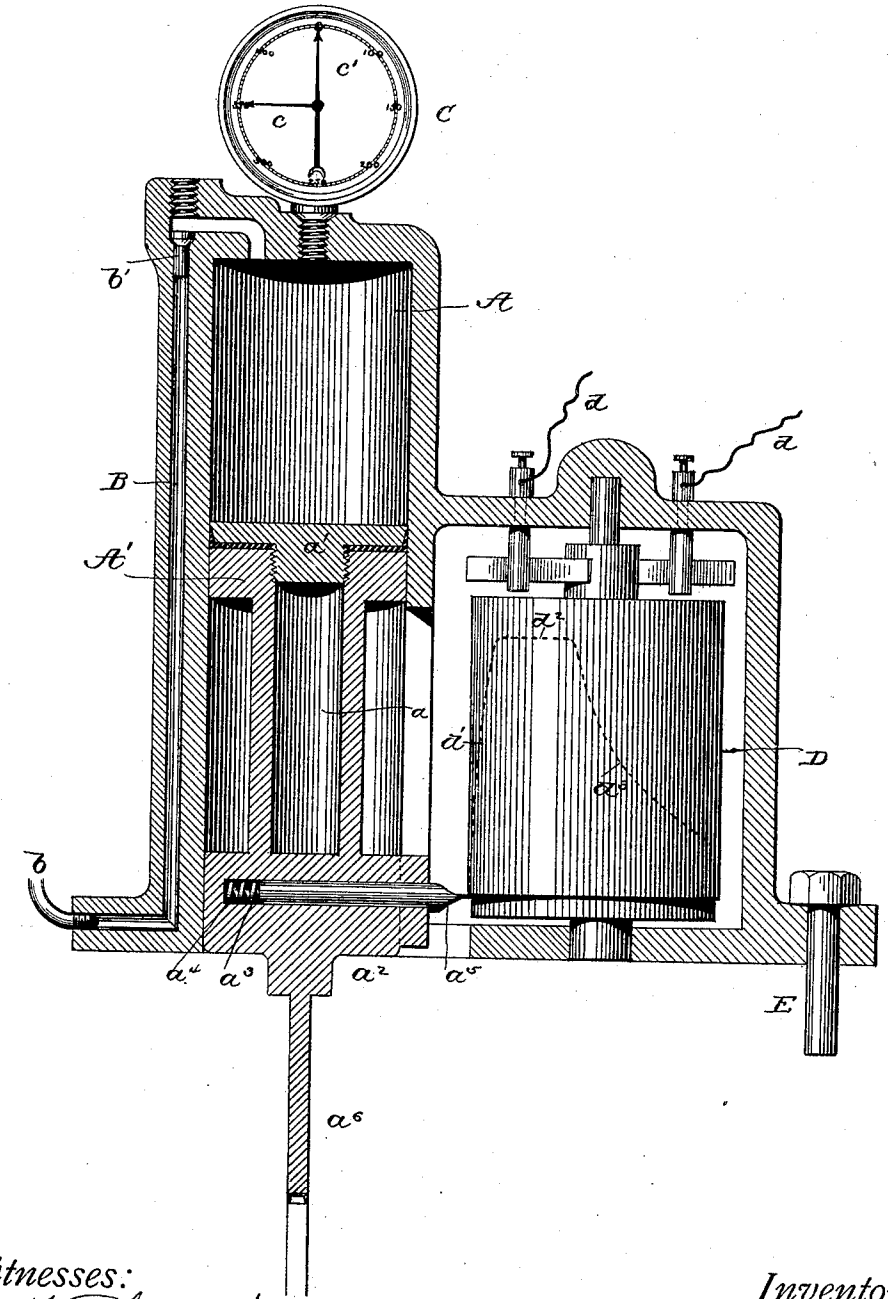
(No Model.)

G. E. SPILLER.

MEANS FOR INDICATING THE PRESSURE IN A GUN WHEN DISCHARGED.

No. 391,392. Patented Oct. 16, 1888.



Witnesses:
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by

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UNITED STATES PATENT OFFICE.

GEORGE E. SPILLER, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO THE SOUTH BOSTON IRON WORKS, OF SAME PLACE.

MEANS FOR INDICATING THE PRESSURE IN A GUN WHEN DISCHARGED.

SPECIFICATION forming part of Letters Patent No. 391,392, dated October 16, 1888.

Application filed November 23, 1887. Serial No. 256,003. (No model.)

To all whom it may concern:

Be it known that I, GEORGE E. SPILLER, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Means for Indicating the Pressures in a Gun when Discharged; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to devices for indicating and recording pressure.

The object is to indicate the different pressures within a gun from the ignition of the explosive to the escape from the muzzle.

With these objects in view, the invention consists in means for indicating the pressure within a gun at different moments or times from the instant of ignition or explosion of the charge to escape from the muzzle by causing the pressure to be brought to bear to move a marker upon a revolving surface, whereby the resulting curve or diagram will show the varying pressures and designate the place in the gun at which particular pressures are exerted.

In the accompanying drawing forming part of this specification, and in which like letters of reference indicate corresponding parts, the figure is an illustration of a pressure-indicating device embodying my invention.

Referring to the drawing, A represents a cylinder constructed of metal which will be capable of resisting a high pressure. Within this cylinder is fitted a piston, A′, formed of a hollow portion, a, and a piston-head, a', screwed therein, and the lower portion, a^2, having a lateral opening, a^3, formed therein for the reception of a spring, a^4, and a stylus, a^5. To the lower portion, a^2, is attached a stem or rod, a^6, which is designed to fit snugly within the vent-hole of a gun, in order that when the gun is discharged the said stem may receive the full force of the shock.

Extending from the top to within a short distance of the bottom of the cylinder is an air-pipe, B, formed in the side of the said cylinder, the bottom portion being provided with a curved inlet-pipe, b. Near the top the opening is slightly larger in diameter than the rest of the pipe in order to accommodate a gravity-valve, b', at which point the air-pipe branches and connects with the top of the cylinder. Secured to the top of the said cylinder is an air-pressure gage, C, provided with a stationary hand, c, designed to mark the maximum pressure to which the air-chamber A^2 may be subjected, and a movable hand, c', which indicates the different pressures when the air-chamber is being charged.

Mounted in a suitable manner on the frame to which the cylinder is secured is another cylinder, D, forming an armature, to which is connected wires d, which convey the electricity to the armature from a suitable electrical generator. On this cylinder is placed a paper having marks or lines to indicate different degrees of pressure, the lowest mark being at the point of the stylus, and the highest mark indicating the greatest pressure exerted within the bore when the gun is discharged.

The mode of operation is as follows: A suitable air-compressing device is connected to the pipe b, and air is forced into the cylinder A until the maximum pressure has been reached, the gravity-valve b' preventing the escape of air. The device is then placed on the gun, and is secured thereto by means of a bolt, E, which screws into the frame of the gun, the stem a^6 being inserted into the vent-hole. The electro-dynamic machine is then started, it being designed that it should revolve with the greatest speed possible. When the gun is discharged, the piston A′ is driven upward with great velocity, and the stylus records a nearly straight mark, as shown in the drawing by d', the air in the cylinder acting as a cushion, against which the piston pushes. When the piston has reached its highest point, the stylus makes the nearly straight line d^2, and in resuming its normal position the long curved line d^3 is made. All these lines are slightly curved, owing to the great rapidity with which the armature revolves.

To determine the different pressures which have been exerted within the bore of the gun by the explosion, it is only necessary after having stopped the electro-dynamic machine to note the highest point indicated by the stylus on the paper. This mark will indicate the

pressure when the explosion first took place, the nearly straight line running at right angles to this, the pressure from the time the projectile left the breech until it escaped from the muzzle, the long curve being made by the piston resuming its normal position.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a pressure-indicating device, the combination, with a cylinder, of a piston, a marker connected therewith, and a stem adapted to engage the vent-hole of a gun to operate the piston, substantially as described.

2. In a pressure-indicating device, the combination of a cylinder, a piston, a marker connected therewith, and a stem adapted to engage the vent-hole of a gun to operate the piston, with a revoluble cylinder having a suitable surface upon which to record a mark, whereby upon the explosion of the charge the resulting curve or diagram will show the varying pressures in the gun, substantially as described.

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

GEORGE E. SPILLER.

Witnesses:

FRANK J. TUTTLE,

ALBERT TUTTLE.