No. 754,885. PATENTED MAR. 15, 1904.

L. OBRY.

AUTOMATIC FIRING DEVICE FOR ORDNANCE.

APPLICATION FILED SEPT. 12, 1903.

NO MODEL.

Fig. 1.

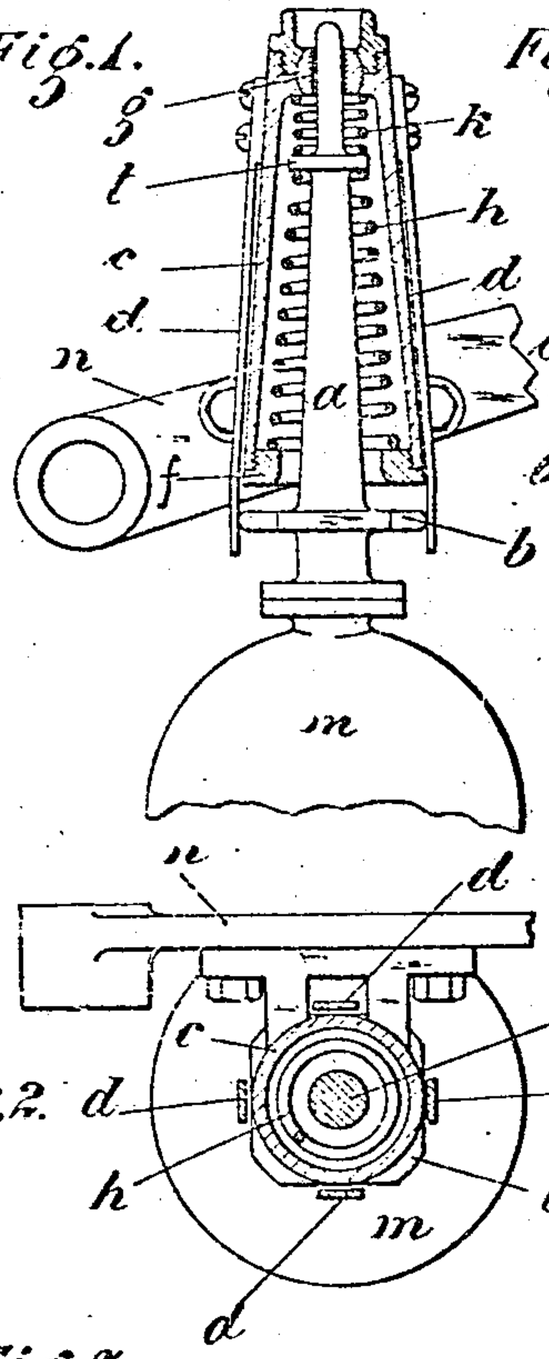


Fig. 3.

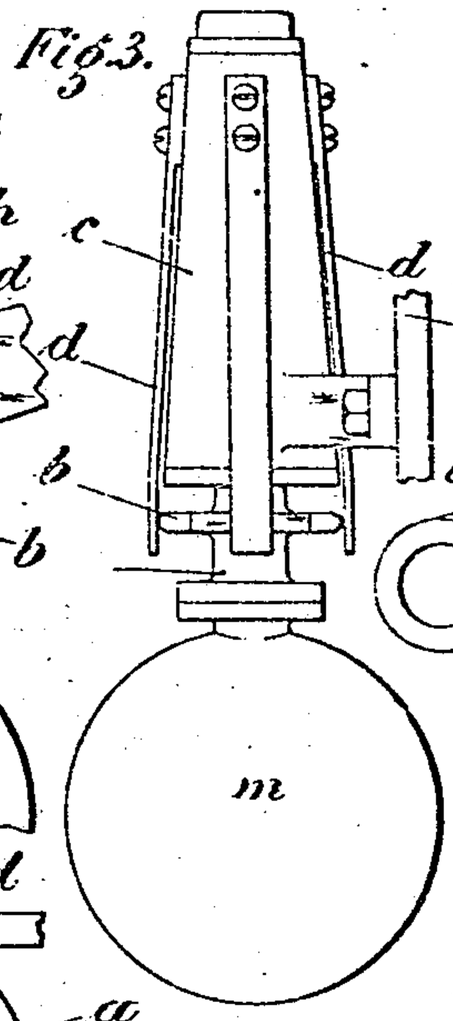


Fig. 4.

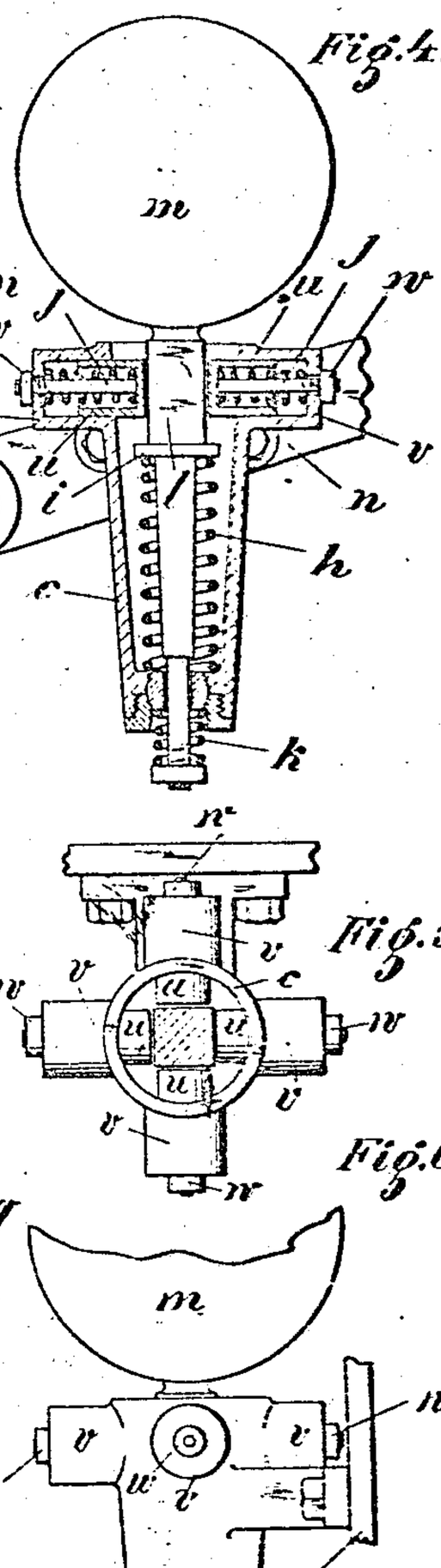


Fig. 2.

Fig. 8.

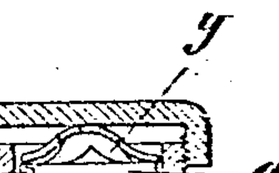


Fig. 5.

Fig. 6.

Fig. 7.

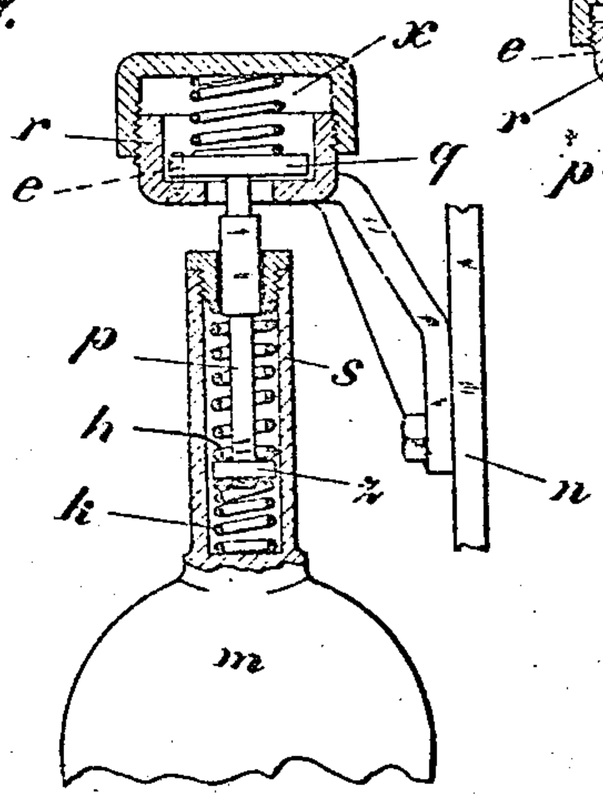
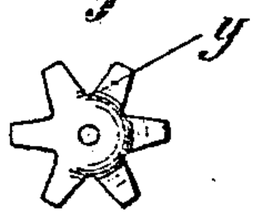


Fig. 9.



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No. 754,885. Patented March 15, 1904.

UNITED STATES PATENT OFFICE.

LUDWIG OBRY, OF TRIEST, AUSTRIA-HUNGARY.

AUTOMATIC FIRING DEVICE FOR ORDNANCE.

SPECIFICATION forming part of Letters Patent No. 754,885, dated March 15, 1904.

Application filed September 12, 1903. Serial No. 172,964. (No model.)

To all whom it may concern:

Be it known that I, LUDWIG OBRY, engineer, of Triest, in the Empire of Austria-Hungary, have invented certain new and useful Improvements Relating to Automatic Firing Devices for Ordnance; 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.

Automatic firing devices for guns which, as described in American Patent No. 678,757, operate in such a manner that the gun is fired automatically at that moment at which the axis of the gun presents the desired angle to the horizon are mounted, as described in American Patent No. 680,066, in such a manner that on the one hand they may be elevated relatively to the axis of the gun and independently of the same, while on the other hand they participate in the movement of elevation of the gun. In the greater number of types of modern ordnance this method of mounting renders it necessary that the apparatus should at the moment of firing be in complete positive connection with the gun-barrel or with a carriage participating in the movement of elevation, so that the recoil necessarily caused by the firing of the gun and other shocks are directly transmitted to the apparatus. Experience has shown, however, that these shocks are highly detrimental to the efficient operation of the apparatus, as the intervals of time elapsing between the successive discharges are insufficient for the damping of the vibrations of the oscillating mass produced by the powerful shocks and, further, that in some types of ordnance these shocks are so violent that they may readily give rise to deformation of the various parts of the apparatus. In order to obviate these defects, the apparatus is not connected directly to the lever participating in the movement of elevating and sighting, but by the intermediary of a part which while it maintains the firing device in a definite position relatively to the lever and the same time permits it when violent shocks occur to participate to a decreased extent in the displacement of the lever caused by such shock. The desired result is attained in accordance with this invention by providing a spring suspension or support for the apparatus, so that it is able to oscillate up and downward and around its point of suspension and is maintained in a definite position or brought back to such position relatively to the intermediate part by springs arranged in such a manner that these latter assume their position of repose when the apparatus has reached the last-named position.

The invention is illustrated in the accompanying drawings, in which—

Figures 1, 2, and 3 illustrate the mounting device in vertical and horizontal section and front elevation. Figs. 4, 5, and 6 show a modified form of the device in the same way. Figs. 7 and 8 are two further modifications. Fig. 9 is a horizontal view of the spring used in the modification shown in Fig. 8.

According to this invention, referring to Figs. 1 to 3, the firing device is carried by a spindle *a*, which is suspended in a conical casing *c* in such a manner that a strong spring *h*, arranged between the bottom *f* of said casing *c* and a collar or flange *t* on the spindle *a*, carries this spindle *a*, while a second spring *k*, arranged between the upper side of the collar or flange *t* and the cover of the casing, presses the flange against the spring *h* first described. In order to permit the spindle, which owing to this suspension is able to move up and down within certain limits, to oscillate laterally also, but to invariably return it to a certain normal position relatively to the casing *c*, it is carried through the ball-joint *g*, maintained in the cover of the casing *c*, and provided with a flange *b* of square or regular polygonal shape, the sides of which come into contact with the ends of flat springs *d*, arranged upon the periphery of the conical casing *c* and resting on the same. The spindle *a* is therefore retained in its median position by the united action of all the flat springs and is automatically returned to this position when from any cause it is displaced from this median position. Consequently when the casing *c* is displaced in any direction owing to a shock the firing apparatus will participate in this displacement to the extent to which it is caused to do so by the counter-pressure of the

spring or springs which have been bent outward by the flange *b*, which has the tendency to remain in its position of repose, and upon the cessation of the effects of the shock will return to its normal position relatively to the casing. In the same way the apparatus is able to remain stationary in opposition to pressure exerted from above, downward, or vice versa, owing to its elastic suspension.

In a modified method of mounting, referring to Figs. 4 to 6, the firing apparatus is carried by a stronger spring *h*, working against a flange *i* of the spindle, while the smaller spring *k*, bearing against the under side of the ball-joint *g*, presses the spindle *a* slightly downward in opposition to the action of the larger spring *h*, so that here also the apparatus is only able to move up or down by straining one of the two oppositely-acting springs.

Obviously the flat springs *d* above described may also be employed with this arrangement; but in this constructional form they are replaced by spring-pistons *u*, which act upon the faces of the prismatic portion of the supporting-spindle *a* of the apparatus and are carried in cylinders *v*, formed with the casing *c*. The stroke of the pistons *u* is adjusted and limited by suitable nuts *w*. In this case also when any shock is produced the pistons *u*, working in opposition to the direction of this shock, are pressed back and then react to a smaller extent upon the spindle *a* and resume their normal position upon the termination of the effect of the shock.

In a further constructional form (shown in Fig. 7) the spring suspension is obtained, owing to the fact that springs *h* and *k* act upon both sides of a piston *z*, sliding in a cylinder *s*, carrying the firing apparatus *m*. Provision is made for absorbing lateral shocks by causing a disk *q*, arranged on the upper extremity of the spindle *p*, to rest upon the bottom of a box *r*, which is attached to the part *n*, participating in the movement of elevation, this disk *q* being pressed against the flange-shaped box-bottom by a spring *x*, bearing against the cover of the box *r*.

A laterally-acting shock only affects the apparatus to the extent that the disk *q*, overcoming the pressure of the spring *x*, acting against it, places itself obliquely to the bottom of the box—that is to say, rises from the same on one side—while upon a return to the position of repose the disk *q*, and with it the firing apparatus *m*, return to the normal position.

As shown in Figs. 8 and 9, the spiral spring *x* may also be replaced by a star-shaped concave blade-spring *y*. The points of spring rest upon the aforesaid disk *q*, a same effect is produced as with the spring.

In order to prevent any undesirabl tion of the parts, the square portion spindle *p* is carried through a recta opening in the cover of the cylinder *s* pin *e* is fixed upon the bottom of the b engages in a slot in the aforesaid disk

I claim—

1. In a device of the character des the combination with the firing devi spring-support for the same and emb oppositely-acting springs, acting at a to the length of said support and the tude of oscillation of which is limited direction which corresponds to the p in the normal position, said springs to maintain said device and to bring t back to a definite normal position.

2. In a device of the character de the combination with the automatic fi vices, of a spindle supporting the sa provided with a flange having a regula onal form, a casing for said spindle springs mounted on the periphery of ing to act against said flange.

3. In a device of the character d the combination with the automatic fi vices of a spindle supporting the sa provided with a flange having a regula onal form, a casing for said spindle springs mounted on the periphery of ing to act against said flange and sp different power acting in opposite di on said spindle.

4. In a device of the character des spring-support for the automatic fi vice, the same comprising an endwise- spindle a ball-joint for one end there sitely-acting springs of different pow on said spindle and means acting at to the direction of movement of the for limiting the amplitude of oscilla direction corresponding to the pressu normal position.

5. In a device of the character d the combination of an endwise-mova dle springs disposed to act in oppos tions thereon, and means coöperat said spindle for absorbing lateral sh

In testimony whereof I affix my si

LUDWIG (

In presence of—
ORESTES DEMARTINI,
VINCENT BURES.