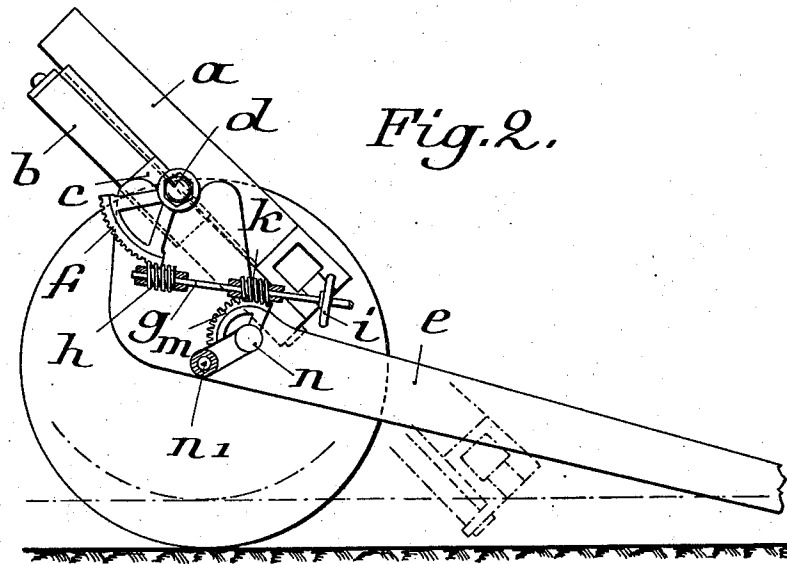
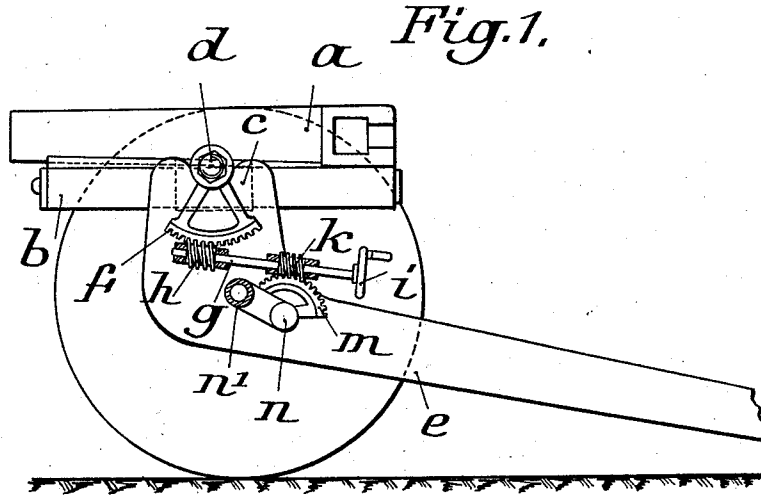


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GUN HAVING A RECOILING BARREL.
APPLICATION FILED DEC. 27, 1910.

1,000,216.

Patented Aug. 8, 1911.
3 SHEETS—SHEET 1.



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Fig. 3.

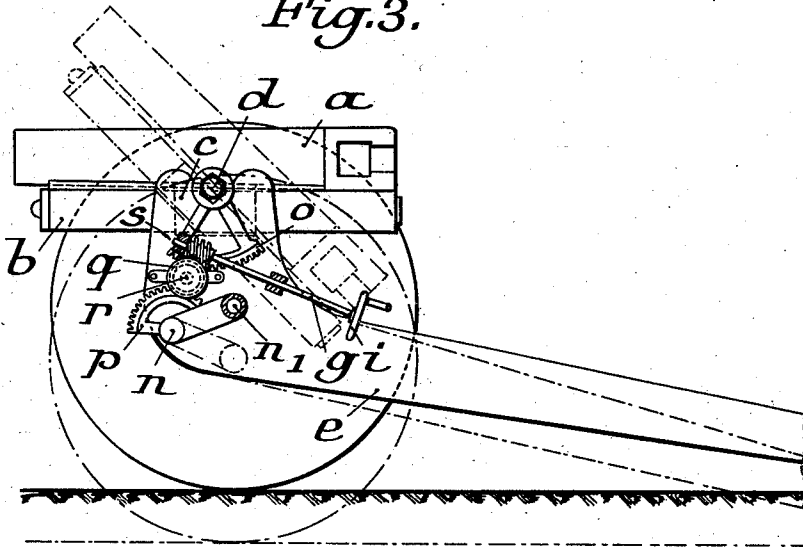
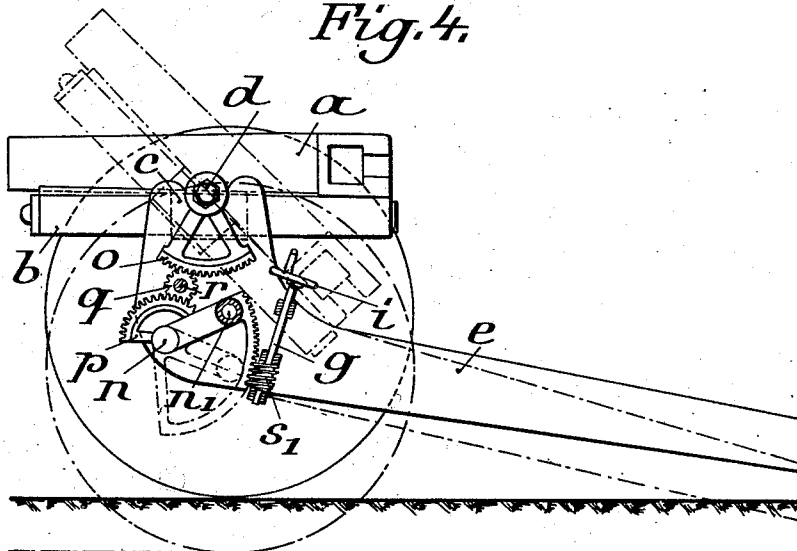


Fig. 4.



WITNESSES

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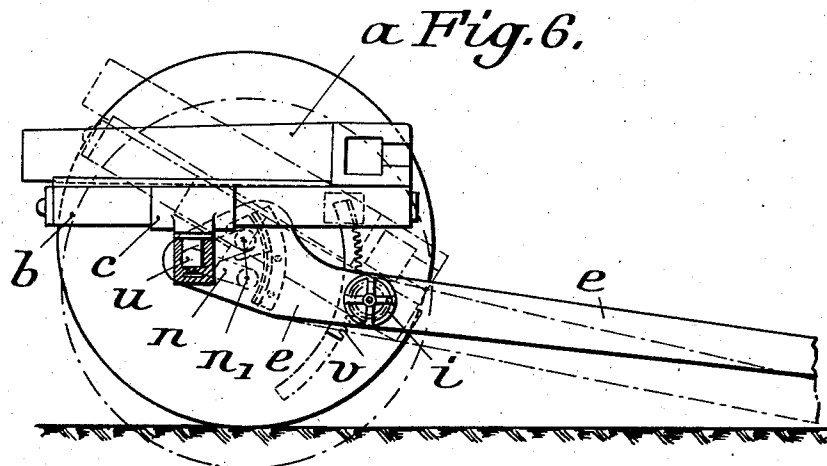
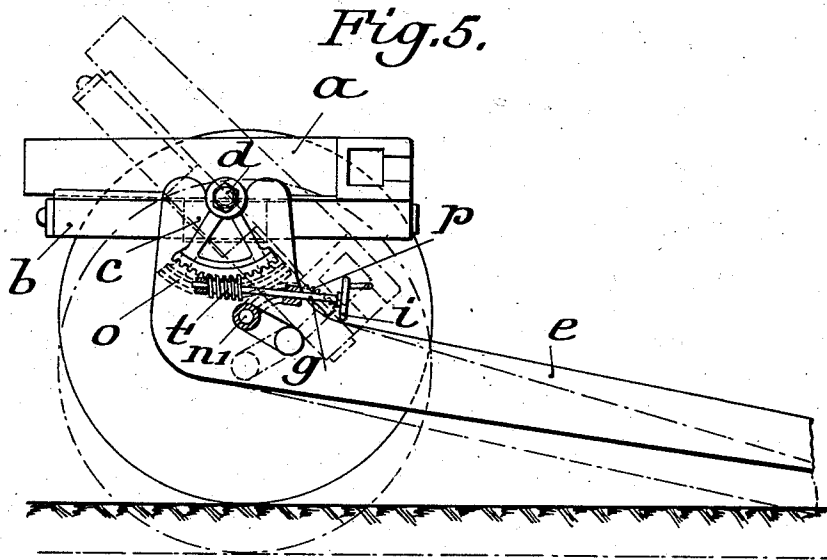
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UNITED STATES PATENT OFFICE.

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GUN HAVING A RECOILING BARREL.

1,000,216.

Specification of Letters Patent.

Patented Aug. 8, 1911.

Application filed December 27, 1910. Serial No. 599,289.

To all whom it may concern:

Be it known that I, KARL VÖLLER, engineer, a subject of the German Emperor, residing at 12 Scharnhorststrasse, Düsseldorf, Germany, have invented certain new and useful Improvements in Guns Having Recoiling Barrels; 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.

In order that guns mounted comparatively near the ground or like support and intended to fire at high elevations, may have the same length of recoil of the barrel at all elevations, it has been proposed to construct the gun in such a manner that when the barrel is elevated the axis about which it turns in being elevated is automatically raised.

In one construction of this kind the trunnions of the barrel or of the cradle are journaled in oscillating arms linked to the gun carriage which, when the barrel is elevated, are turned relatively to the gun carriage in such a manner that the trunnions are lifted. This construction lacks stability and necessitates the adding of the oscillating arms which considerably increases the weight of the gun. Moreover, the play which the two pairs of pivots on which the barrel oscillates in being elevated (the trunnions and the pivots of the oscillating arms) have in their bearings exercises an unfavorable influence on the precision of the shooting.

In another construction the gun has a cranked wheel axle, the cranked portion of which turns in bearings in the gun carriage. This axle is not, however, connected with the elevating mechanism. For high elevations, therefore, the gun carriage must be raised separately, that is to say independently of the elevating mechanism, by turning the cranked axle, if the recoiling barrel is not to strike the ground. If in such constructions, owing to some oversight, the gun carriage is not raised, the gun may be very seriously damaged.

The present invention consists in a combination of these two constructions whereby the disadvantages of both are obviated. The gun has a cranked wheel axle, the cranked portion of which is journaled in the gun carriage and is positively connected with the elevating mechanism of the gun in such a manner that when the barrel is elevated, the cranked portion of the axle turns so that the actual wheel axles carried by the crank arms are depressed relatively to the gun carriage. Since the actual wheel axles cannot be depressed as they are supported by the wheels, the result of the movement is a lifting of the gun carriage and the trunnions journaled therein.

The invention is illustrated in the accompanying drawings, Figures 1 and 2 being sectional elevations of one form of construction, showing the gun with its barrel horizontal and at its maximum elevation respectively. Figs. 3 to 6 show in sectional elevation each a different construction.

The barrel *a* slides backward in the cradle *b* during the recoil. The carrier *c* of the cradle *b* is suspended by trunnions *d* in the gun carriage *e* and can be brought to the desired elevation by elevating mechanism. In Figs. 1 and 2 this elevating mechanism consists of a toothed segment *f* keyed to the trunnions *d* and in gear with a worm *h*. The shaft *g* of this worm turns in bearings on the gun carriage *e* and is rotated by the handle *i*. The shaft *g* carries another worm *k* which engages a toothed segment *m* mounted on the cranked portion of the cranked wheel axle *n* co-axially therewith. This cranked portion *n* of the axle is mounted to turn freely in the gun carriage *e*. When the elevating mechanism is operated by the handle *i*, the cranked portion *n* of the axle turns in its bearings and there is relative movement of the actual wheel axles *n'* about this cranked portion. The direction of movement is such that when the muzzle of the barrel *a* is raised, the axles *n'* are depressed relatively to the gun carriage *e*. Since, however, the axles *n'* support the gun carriage through the wheels they cannot be

absolutely depressed so that the whole gun carriage and therewith the trunnions are lifted.

Fig. 2 shows the gun in its position of maximum elevation; the straight dotted line shows the position of the ground relatively to the barrel when the latter is horizontal. The barrel at its highest elevation can recoil into the position shown in dotted lines, whereas if the trunnions had not been lifted the barrel would have been prevented by the ground from taking up this position.

In Figs. 3 to 6 the letters already used refer to similar parts. The modifications shown differ from that just described only in the mechanism for shifting the axle and the barrel. In each figure the position of the parts when the barrel is horizontal is shown in full lines, and the position at maximum elevation is shown in dotted lines.

In Fig. 3, the trunnions d and the cranked part n of the axle are provided with toothed segments o and p respectively, which engage the pinion q journaled in the gun carriage. The shaft r of this pinion is turned by the handle i through a worm gear s so that the barrel a and the axle n are together turned in the desired directions.

Fig. 4 differs from Fig. 3 only in that the axle n is itself turned through a worm gear s' by handle i ; this movement is transmitted through the toothed segment p , pinion q and toothed segment o to the barrel a . The transmission might equally well be from the gun barrel a in the reverse sense of that just described.

In the form shown in Fig. 5 the pinion q of the preceding forms is eliminated and the toothed segments o and p are in direct engagement with each other. The transmission is in this form from the trunnions d which are moved through the worm gear t by the handle i , but as in Fig. 4, the transmission may be from the axle n .

Fig. 6 shows the application of the invention to a gun in which the barrel is pivoted to turn in a horizontal plane, the trunnions being eliminated and the barrel having its elevating movement around the axle. The cradle b or its carrier c has a vertical pivot u . This turns in a bearing mounted in the cranked portion n of the axle which, as in the preceding constructions, turns freely in bearings in the gun carriage. By means of a toothed segment elevating mechanism v operated by handle i , the breech end of the barrel a can be raised or depressed so as to vary the elevation. Through the pivot u this turning movement is shared by the axle n and this is therefore raised or depressed owing to its connection with the wheel axles n' .

It is preferable that the proportions in

the aforesaid constructions should be such that when the gun is at mid-elevation, the wheel axles n' and the cranked portion n of the axle should lie in the same horizontal plane. When this is the case the movement which the wheel axles make relatively to the gun carriage in a direction parallel to the longitudinal axis of the gun is reduced to a minimum. This is of importance because the shifting of the axle in the longitudinal direction of the gun involves variation of the pressure on the trail spade. By such an arrangement therefore there is obtained as constant a spade pressure as possible, which is not the case with guns referred to in the opening paragraphs hereof.

I claim as my invention:

1. In a recoiling gun, the combination with a pivoted barrel, of a carriage for the barrel, a cranked wheel axle, the cranked portion of which is journaled in the carriage, elevating mechanism for the barrel, and a positive connection between the axle and the elevating mechanism for simultaneously raising the cranked portion of the axle and the carriage as the barrel is elevated.

2. In a recoiling gun, the combination with a pivoted barrel, of a carriage for the barrel, a cranked wheel axle, the cranked portion of which is journaled in the carriage, elevating mechanism for the barrel, a toothed segment carried by the cranked portion of the wheel axle co-axially therewith, and a shaft for operating the elevating mechanism of the barrel having a worm engaging said toothed segment.

3. In a recoiling gun, the combination with a pivoted barrel, of a carriage for the barrel, a toothed segment fixed to a trunnion of the barrel, a cranked wheel axle, the cranked portion of which is journaled in the carriage, a toothed segment carried by the cranked portion of the wheel axle, and gearing engaging both toothed segments for simultaneously turning the barrel and the cranked axle about their axes of rotation.

4. In a recoiling gun, the combination with a pivoted barrel, of a carriage for the barrel, a toothed segment fixed to a trunnion of the barrel, a cranked wheel axle, the cranked portion of which is journaled in the carriage, a toothed segment carried by the cranked portion of the wheel axle, and an operating shaft having worms engaging said toothed segments for simultaneously turning the barrel and the cranked axle about their axes of rotation.

5. In a recoiling gun, the combination with a pivoted barrel, of a carriage for the barrel, a cranked wheel axle, the cranked portion of which is journaled in the carriage, elevating mechanism for the barrel,

and a positive connection between the axle
and the elevating mechanism for simulta-
neously raising the cranked portion of the
axle and the carriage as the barrel is ele-
vated, the cranked portion of the wheel axle,
5 when the barrel is at mid-elevation, being
in the same horizontal plane as the axis of
the wheels.

In testimony whereof, I have signed this
specification in the presence of two subscrib- 10
ing witnesses.

KARL VÖLLER.

Witnesses:

HENRY HASPER,
WOLDEMAR HAUPT.

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