

N<sup>o</sup> 4126



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COMPLETE SPECIFICATION.

**"Improvements in Recoil Operated Fire Arms".**

I, GEORG LUGER of No. 28 Weimarer Strasse, Charlottenburg near Berlin Germany, Engineer, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement;

5 This invention relates to recoil-operated fire-arms of the kind in which the breech block is actuated by means of a pair of toggle links controlled by a spring; and it has for its chief object to provide an improved form of connection between said spring and the toggle links whereby the action of the one will be transmitted to the other in a more advantageous way than has  
10 heretofore been the case.

In recoil-operated fire arms having toggle-link breech mechanism, arrangements of the closing spring are already known, in which the latter is caused to act indirectly through intermediate links and levers one of which has been  
15 a bell crank lever on one of the members of the toggle-link in such a manner that the force exerted by the spring on the said crank member is more effective at the time when the toggle mechanism effects the closing position of the breech block, the leverage of the spring action being comparatively less during the opening movement for the purpose of being adapted to the progressively increasing spring tension, which is obviously strongest in the opening position  
20 in consequence of the recoil action. The spring pull on the crank member of the toggle link mechanism, as described in the Specification to my prior British Patent No. 9040 of 1899, attains to some extent the aforesaid effect, as the intermediate link interposed between the crank member and the end of the spring transmits the spring action to the said crank member with either  
25 a larger or smaller leverage, according as the toggle joint is on the point of the closing position or that of the opening position.

This invention consists in an improved construction in that instead of the direct action of the spring on the intermediate link, the bell crank lever is interposed between the spring and the link. By this combination, the transmission of the spring action is practically attained with a better leverage and  
30 with an arrangement of the parts occupying the smallest space possible.

As compared with the existing form of construction, in which the bell crank referred to is employed, the present construction differs in that the connection of the parts is a positive one by pivots, whilst according to said earlier construction, the articulation is such that the bell crank lever has at different  
35 parts of its movement, different points of contact with the member of the toggle.

The accompanying drawings show the new arrangement as adapted for use with a small arm, (although the device is of course also applicable for pistols  
40 and other fire-arms.

In these drawings, Figures 1 and 2 shew the parts in different positions.

It will be understood that in so far as a recoil-movable barrel with a forward propelling spring is employed in a fire arm, its operation may likewise be

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*Luger's Improvements in Recoil Operated Fire Arms.*

arranged in accordance with the present invention, and independently of, as well as in connection with the breech.

The drawings show an arrangement in which the force of a helical thrust spring is utilized to obtain a double leverage. *v* is the breech bolt which is actuated by a toggle-mechanism, consisting of two pivotally connected members *m*, *n*, which form known parts of a breech opening and closing device. A bell crank lever *i j* with fulcrum *o*<sup>3</sup> is pivotally arranged beneath the rear member *n*. The arm *i* of the lever *i j*, which is under the action of the spring *b*, arranged in this case as a compressive spring, is so adjusted in relation to the spring acting centre line that the smallest leverage (Fig. 2) co-operates with the strongest spring tension. The upper arm *j* of the bell crank lever is connected to an S-shaped leverage member or link *a* and this engages with the rear member *n* of the toggle joint in such a manner that for the rear end position shown in Figure 2, the shortest leverage *i.e.* the shortest distance from the fulcrum *n*<sup>1</sup> to the line of operation of the transmitting member *a* represents the leverage of the closing moment, whereas the engagement in a starting position, as shown in Figure 1, takes place with a larger leverage *i.e.* under the condition of the longer distance of the fulcrum *n*<sup>1</sup> from the line of operation of the transmitting member *a*. The co-operation of the leverage member *i j* with transmitting member *a* consequently produces a double or multiplied transmission or leverage between spring and breech member.

The closing operation is moreover advantageously assisted by the downwardly directed pull of the lever arm *j*, whereby the rear member *n* is brought down to its straight position.

The respective distances in question, which are measured from the centre lines of action, are indicated by dotted lines for the sake of comparison.

The spring *b* may of course be arranged according to the shape of the fire arm in any suitable position relative to the leverage members *i j* and *a*; and instead of one spring, a number of springs can be employed in juxtaposition or in series; or a plate or strip spring may be used in place of the helical spring shown.

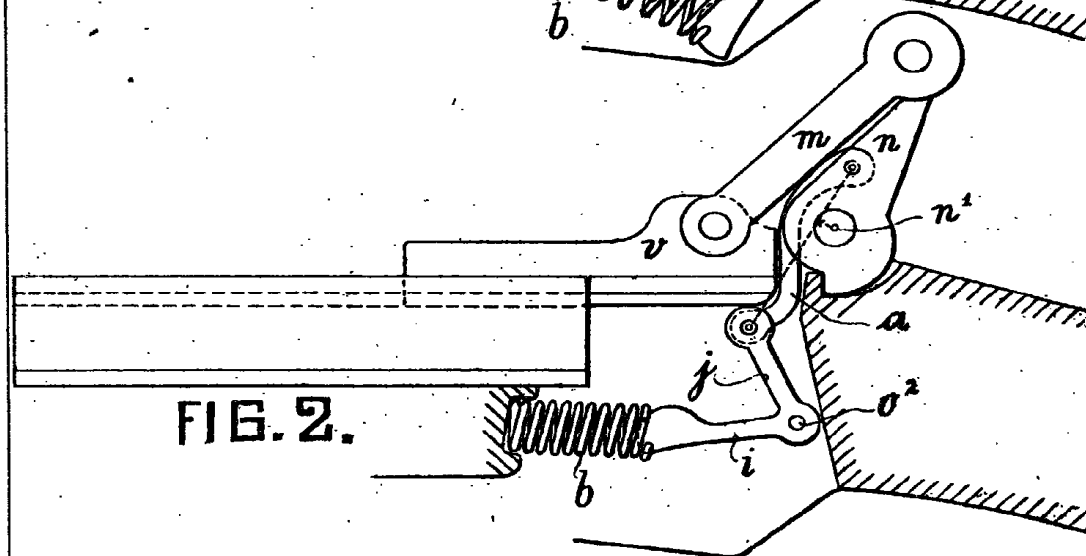
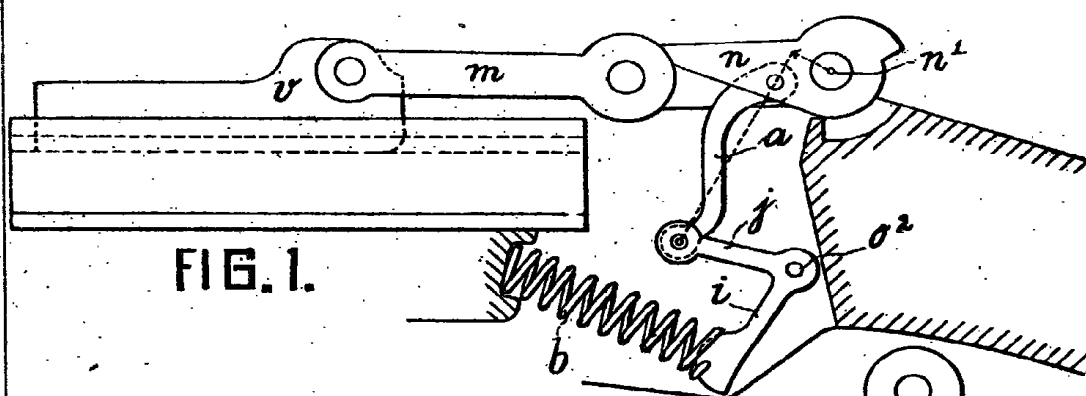
By adopting the above-described construction, it is unnecessary to select a comparatively lower limit for the initial spring pressure *i.e.* that which maintains the closed position of the breech, otherwise this precaution would be necessary because the progressive strain of the springs would act too strongly towards the end of the stroke and tend to exert a too rapid counteraction.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

A recoil-operated fire arm in which the toggle members for operating the breech bolt are so pivoted to a link which is in turn pivoted to one arm of a bell crank lever which is directly acted upon by a spring as to positively transmit the power of the spring to the breech block in a multiplied ratio substantially as described.

Dated the 19th day of February 1906.

PHILIP M. JUSTICE.  
Filing Agent.



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[This Drawing is a reproduction of the Original on a reduced scale.]