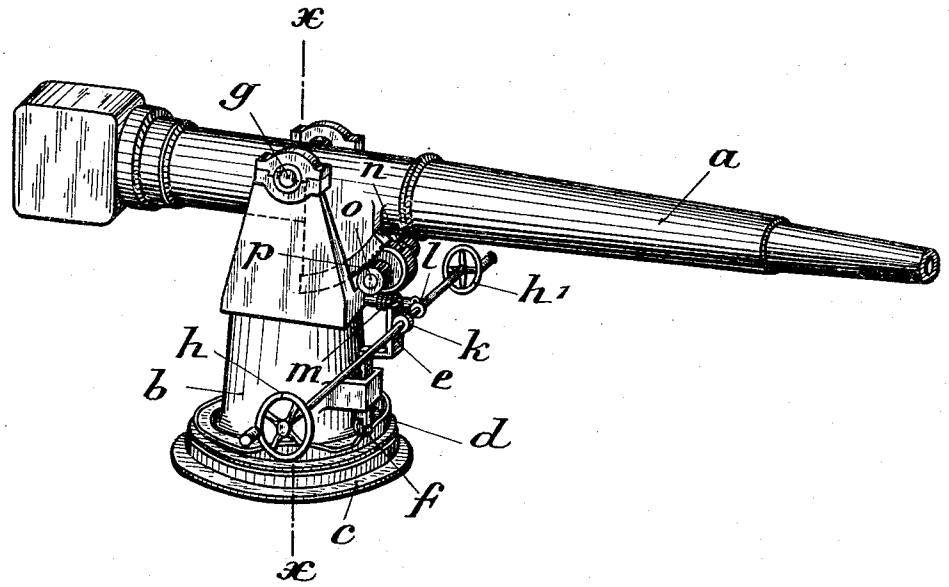
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POINTING MECHANISM FOR GUNS

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POINTING MECHANISM FOR GUNS

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The present invention relates to a pointing mechanism for guns, especially for naval guns having their range of aim limited by danger zones.

At times guns, especially naval guns, cannot be so freely pointed that they can be fired at any elevation and lateral angle, since surrounding structures do not permit of firing the gun in certain positions. The pointing of such guns has heretofore been limited in such danger zones by abutments or stops, which comprise structurally, either as fixed stops or movable abutments controlled by cam guides, a model of the outline of the interfering structures. But when the gun barrel, in swinging laterally, strikes against such an abutment, it is arrested and the barrel must then be elevated by the vertical pointing mechanism before it can be swung further around.

In accordance with the present invention, the elevating pointing mechanism is positively connected to operate with the lateral pointing mechanism, when the gun barrel is swung to the limiting angles of the danger zones, so that the barrel mouth is automatically raised as far as the interfering structures render necessary. The lateral swinging of the gun, in following the target, is, therefore, not interrupted by the danger zones and does not need to be accompanied by a separate operation of the gun elevating mechanism.

The drawing illustrates an embodiment of the invention applied to the gun of a ship.

The barrel *a* is mounted by means of its trunnions *g* in the turret *b*, which is rotatable in the fixed base member *c* around the vertical axis *x*—*x*. Around the member *c* is the fixed cam track *d* having the shape of the outlines of the structures in the vicinity of the gun. A rack *e*, vertically guided on the turret *b*, is provided at its lower end with a roller *f*, running on the cam track *d*. The rack is engaged by a pinion *k*, which is keyed on the driving shaft of the gun elevating mechanism. The rotation of this shaft by the hand-wheels *h* or *h'* is transmitted through the bevel gears *l*, the self-locking worm-gearing *m* and *n*, and the pinion *o*, in mesh with the segment *p* of the turret, to the gun barrel. The operation is as follows:

The gun is elevated by turning the hand-wheels *h* or *h'*, whereby, at the same time, the rack *e*, slidably mounted on the turret *b*, is moved in the same direction, i. e., is raised when the barrel mouth is swung upwardly and is lowered when the barrel is moved downwardly. The maximum degree of any lowering, which can be imparted to the barrel in its various lateral positions within the range of perhaps 360°, is determined by the engagement of the rack roller *f* with the cam track *d*.

If, at the beginning of a lateral swinging movement of the gun barrel about its vertical axis *x*—*x*, the roller *f* rests on the cam track or comes into contact with the same in the course of the said movement, then the rack *e* and, through the transmission gearing *m*, *n*, *o* and *p*, also the barrel, are so elevated that the barrel mouth and the direction of the shot will always be maintined outside the zones, which it would otherwise endanger and, therefore, must not traverse. The elevation of the barrel, accordingly, takes place automatically in dependence upon the swinging of the barrel towards said zones.

By suitably selecting the ratios between pinion *k* and rack *e* and the transmission gearing *m*, *n*, *o* and *p* of the elevating mechanism, the vertical dimensions of the cam track *d* and the travel of the rack *e* can be kept small, and also, by an oblique arrangement of the several inclines of the cam track, the power required to actuate the lateral pointing mechanism, not shown,—whether it be manual or motor-driven—suffices to also impart the required elevation adjustments.

I claim as my invention:

1. Pointing mechanism for turret guns, comprising a fixed cam track having the shape of the outline of the danger zones to be avoided; a rack slidably mounted on the turret of the gun and coacting with the track; and means for elevating the barrel of the gun cooperating with the rack and track for automatically raising the barrel by means of said rack to avoid the danger zones when the gun is moved laterally.

2. Pointing mechanism for turret guns, comprising a fixed cam track having the shape of the outline of the danger zones to be avoided; a rack slidably mounted on the turret of the gun; a roller on the rack coacting with the track; and means for elevating the barrel of the gun cooperating with the rack and track by means of the roller for automatically raising the barrel to avoid the danger zones when the gun is moved laterally.

In testimony whereof, I affix my signature.

EDUARD MÜLLER.