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UNITED STATES PATENT OFFICE.

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RANGE-KEEPER FOR GUNS.

941,626.

Specification of Letters Patent.

Patented Nov. 30, 1909.

Application filed November 20, 1908. Serial No. 463,734.

To all whom it may concern:

Be it known that we, ARTHUR TREVOR DAWSON and JAMES HORNE, both subjects of the King of Great Britain, residing, respectively, at 32 Victoria street, Westminster, in the county of London, England, and Naval Construction Works, Barrow-in-Furness, in the county of Lancaster, England, have invented certain new and useful Improvements in Range-Keepers for Guns, of which the following is a specification.

This invention relates to range keepers of the kind described in the specification of our prior patents No. 890411 and No. 839,274 in which a range indicator or pointer, after being initially set for the range existing between the gun and its target and for the speed at which the range might be varying owing to relative movement between the gun and target, is operated to automatically indicate the proper range notwithstanding the aforesaid variations therein.

In some of the forms of the range keeper set forth in the said prior specification, there is a rotary disk which receives its motion from a clock movement and operates to drive a roller for actuating the range indicator or pointer, the said roller being in frictional contact with the face of the disk. This roller is capable of being moved across the face of the disk into a position farther from or nearer to the center of movement of the said disk, in accordance with the speed at which the range varies.

The present invention has for its object to obviate or minimize any tendency to slip between the aforesaid rotary disk and its friction roller that actuates the range indicator or pointer. For this purpose we employ a pair of disks driven by the clock movement (or other prime mover) at a constant speed in opposite directions, and between these disks we arrange the friction roller, these parts being maintained in yielding contact by springs or equivalent means adapted to exert the requisite degree of pressure by tending to press the disks toward each other. By this arrangement the friction roller is subjected to two equal and opposite driving forces constituting what we may term a true couple drive, the said roller being furthermore mutually supported at its periphery by the opposite driving surfaces of the disks. The pointer-ac-

tuating spindle along which the friction roller is traversed when adjusting it with relation to the center of rotation of the disks need therefore only be made of such strength as is necessary to transmit the rotary movement to the range indicator or pointer, with the result that the parts of the apparatus can be made lighter and more accurate in their operation than heretofore.

In order that our said invention may be clearly understood and readily carried into effect we will describe the same more fully with reference to the accompanying drawings, in which:—

Figure 1 is a face view of the improved driving gear with one of the driving disks removed. Fig. 2 is a plan, and Fig. 3 an end view of the said gear.

A, B are the two rotary disks which are arranged parallel to each other with their axes *a b* coincident, so that they revolve about the same axis of rotation. These axes are arranged to permit of the disks moving to some extent toward one another. The said disks are driven from the clock movement or other prime mover, at a constant speed in opposite directions by means of toothed pinions *a' b'* gearing with teeth formed on the periphery of the disks. C is the friction roller which is situated between the said disks and is mounted in a sliding frame *c* in which it is free to revolve; its boss is connected with the spindle *c'* in any appropriate manner to permit of its sliding on the spindle and at the same time revolving the same. This spindle is carried near its ends in supports *c² c²* and in the example shown is furnished with a toothed pinion *c³* gearing with a toothed wheel *d³* mounted on a spindle *d²* to which the range pointer D is affixed. This pointer moves over a graduated range dial not shown in the drawings. The sliding frame *c* can be adjusted on the spindle *c'* in accordance with the speed at which the range between the gun and its target varies, by mechanism like that set forth in our aforesaid prior specification. E is a rod extending between the said disks and fixed at its ends in the supports *c²*. Mounted on this rod are two hinged or pivoted members F, G provided at their ends with arms *f g*. The free extremities of these arms are furnished with rollers *f' g'* which, under the

influence of springs f^x , are caused to bear against the outer faces of the disks A, B and press the latter against opposite sides of the periphery of the friction roller C with sufficient force to obtain satisfactory frictional driving contact between the disks and the roller.

When the apparatus is working the friction roller will be driven by the two disks exerting equal and opposite forces on its periphery with the resulting advantages hereinbefore stated.

Instead of transmitting the motion of the spindle c' to the range pointer D through gearing $c^3 d^3$ as aforesaid, the motion may in some cases be transmitted directly to the said pointer.

What we claim and desire to secure by Letters Patent of the United States is:—

1. In a range keeper for guns, the combination of a traveling pointer, a pair of disks adapted to be positively rotated at a constant speed and in opposite directions, a friction roller situated between and driven by said disks and capable of adjustment across the faces of said disks, means whereby said friction roller actuates said pointer and means whereby said disks are kept in contact with the roller.

2. In a range keeper for guns, the combination of a traveling pointer, a pair of disks adapted to be positively rotated at a constant speed and in opposite directions, a friction roller situated between and driven by said disks and capable of adjustment across the faces of said disks, means whereby said friction roller actuates said pointer

and means whereby said disks are kept in resilient contact with the roller.

3. In a range keeper for guns, the combination of a traveling pointer, a pair of disks adapted to be rotated at a constant speed, a friction roller situated between and driven by said disks and capable of adjustment across the faces of said disks, means whereby said friction roller actuates said pointer and a pair of spring controlled hinged members adapted to press said disks toward each other.

4. In a range keeper for guns, the combination of a traveling pointer, a pair of disks adapted to be rotated at a constant speed and to be moved toward each other, a friction roller situated between and driven by said disks and capable of adjustment across the faces of said disks, means whereby said friction roller actuates said pointer, a pair of spring controlled hinged members, arms on said hinged members and rollers mounted at the free ends of said arms and adapted to bear against the outer faces of the disks under the influence of the spring controlled hinged members.

In testimony whereof we affix our signatures in presence of two witnesses.

ARTHUR TREVOR DAWSON.

JAMES HORNE.

Witnesses to signature of the said Arthur Trevor Dawson:

HENRY KING,

F. MAGEE.

Witnesses to signature of James Horne:

W. H. ATKINSON,

CHAS. KENNETH COX.