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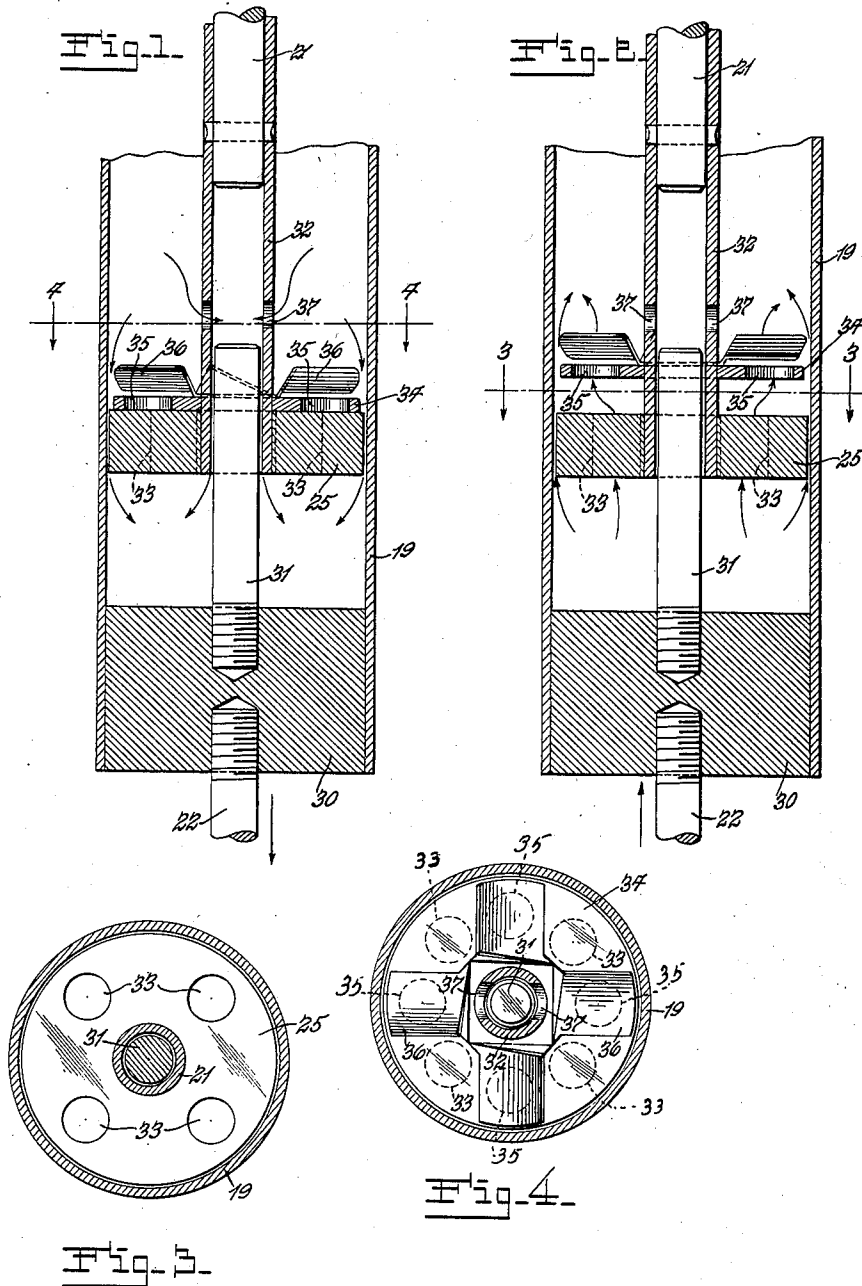
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2,152,800

CONTROL MECHANISM

Filed Dec. 21, 1935

2 Sheets-Sheet 1



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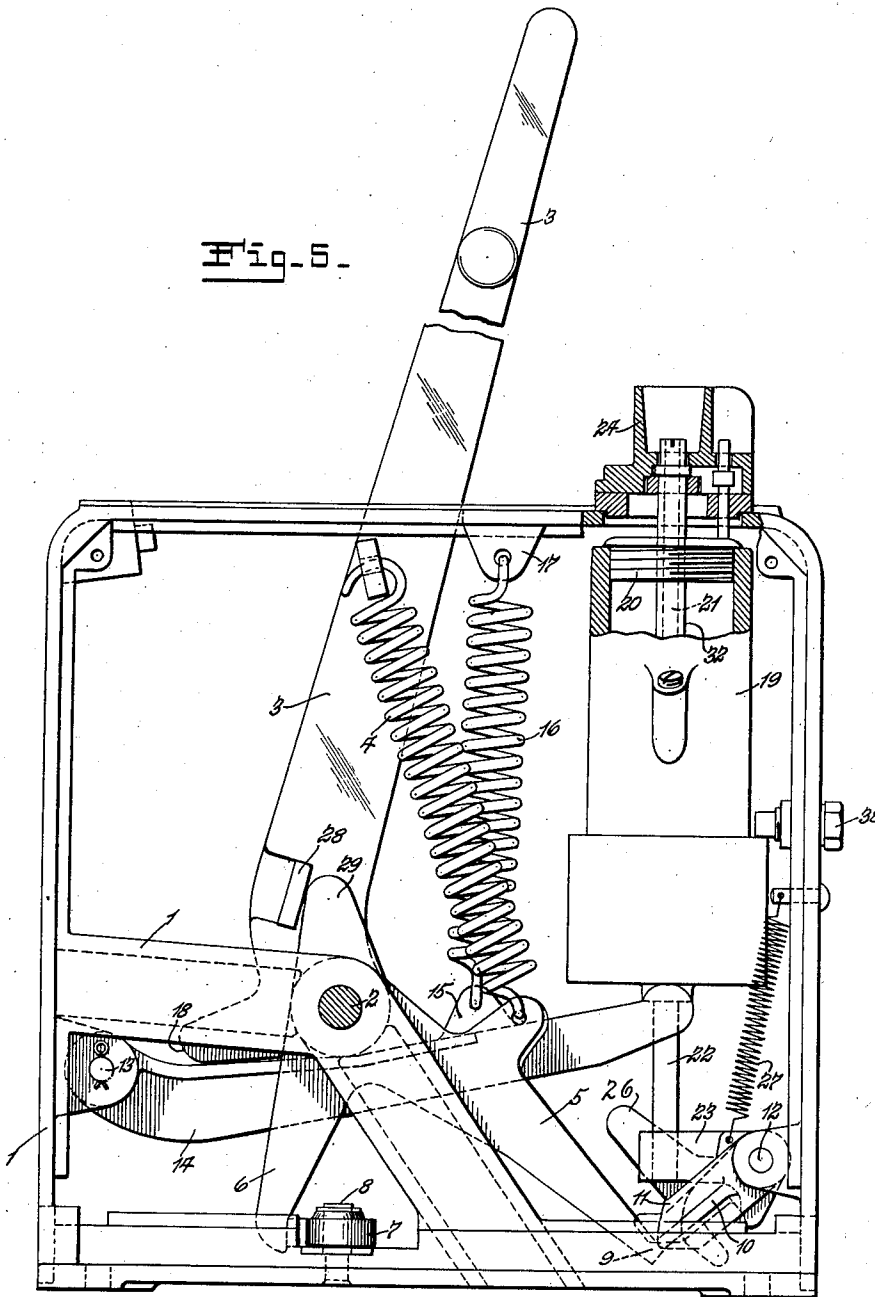
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Fig. 5.



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CONTROL MECHANISM

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6 Claims. (Cl. 124—33)

This invention pertains to timing or delaying devices more particularly as applied to devices for automatically initiating the operation of mechanism. More specifically the invention is described in the following specification as applied to control apparatus for target traps, so as to delay the release of the trap for an undetermined interval.

In the operation of target traps in the sport of shooting clay pigeons and particularly in the game known as skeet shooting, the short time interval between the pulling of the trap control handle and the moment of release of the target has become of great importance. It has been found that some contestants have learned to gauge this time interval with considerable nicety, and in some instances have even worked collusion with the trap operator so as to be able to tell the exact instant the target is to appear. As such knowledge gives them an undeserved advantage over other contestants, it has been found desirable to delay the release of the target an undetermined interval of time after the operation of the controlled handle.

One of the objects of this invention therefore is to provide a mechanism which will automatically insert such a time interval of undetermined duration between the pulling of the handle and the release of the target.

Another object is to provide such mechanism which will vary that time interval between successive operations in a perfectly casual or haphazard manner.

Another object is to provide such mechanism which will vary the time interval, not in definite steps of fixed duration, but to set intervals which may have any duration whatever, within the range of operation of the device.

Another object is to provide means whereby the variation in the intervals may be accomplished by self-actuated means which are entirely automatic.

Further objects will appear from the following description taken in connection with the accompanying drawings in which:

Figure 1 is a vertical sectional view of a fluid cylinder and piston for control apparatus embodying this invention.

Figure 2 is a view similar to Figure 1, but illustrating another phase of operation of the cylinder.

Figure 3 is a horizontal section on line 3—3 of Figure 2.

Figure 4 is a horizontal section on line 4—4 of Figure 1 and

Figure 5 is a side elevation with parts in section showing a target trap control device embodying this invention.

Referring now to the drawings, 1 designates a frame or support in which is journaled a shaft 2. Pivoted on the shaft 2 is an operating lever 3. The lever 3 is connected by a coil spring 4 to an actuator 5, also pivoted on the shaft 2. The actuator 5, has a downwardly extending arm 6, positioned for engagement with a lever 7, shown in end view in Figure 5, and pivoted at 8 on the frame 1. The lever 7 may be connected in any suitable manner to operate the trap. The lower tip 9 of the actuator 5, is positioned for engagement with a laterally extending web 10, on a latch 11, pivoted at 12 on the frame 1. The actuator 5, is thus locked against operation by the latch 11.

Pivoted at 13 on the frame 1, is a horizontally extending lever 14, having a lug 15 connected by a spring 16 to a lug 17 on the upper part of the frame 1. The spring 16 thus yieldingly maintains the lever 14 in elevated position. The operating lever 3 has a rearward extension 18, positioned to engage the upper face of the lever 14, when the operating lever 3 is moved to the left as shown in Figure 5. This movement of the operating lever causes the extension 18 to force the lever 14 downwardly on its pivot.

Mounted for vertical movement in the frame 1 is a fluid cylinder 19. This cylinder has a removable head 20 guided on a piston rod 21. Projecting from the lower end of the cylinder 19 is a guide rod 22 guided in an opening in the bracket 23 on the frame 1. The cylinder 19 is thus capable of vertical movement guided by the rods 21 and 22. This cylinder is supported on the end of the lever 14 which normally maintains the cylinder in elevated position.

The piston rod 21 is adjustably supported in a bracket 24 at the upper part of the frame 1, so that the piston 25 is held stationary in an adjusted position while the cylinder 19 may rise and fall with reference thereto. As will be more fully described hereinafter, the cylinder 19 may contain a fluid which, when the cylinder falls flows past the piston 25 and thus retards the descent of the cylinder 19.

The operation of the mechanism so far described, is as follows: In order to release the target the operator pulls the lever 3 to the left in Figure 5, rotating same on its pivot 2. This movement of the operating lever causes the extension 18 to engage and depress the lever 14 on its pivot 13. Accordingly the support of the lever 14 is

withdrawn from the cylinder 19, which thereupon begins to descend. At the same time the movement of the lever 3 as described stretches the spring 4 and thereby tensions the actuator 5 to rotate on its pivot 2 in a counterclockwise direction as seen in Figure 5. However, this movement is obstructed by the engagement of the tip 9 with the web 10 of the latch 11. The actuator 5 remains thus tensioned by the spring 4 but its movement is obstructed by the latch 11 until the cylinder 19, descends to a point where the cylinder 19 engages an abutment 26 on the latch 11. Such engagement causes depression of the latch 11 on its pivot 12 against the tension of its spring 27. Depression of the latch 11 carries the web 10 downwardly clear of the tip 9 and accordingly actuator 5 is released for operation. This permits the spring 4 to rotate the actuator on the shaft 2 and thereby cause the arm 6 to operate the lever 7 to release the trap.

The operating lever 3, is held in its left hand position till the target is released, whereupon it is returned to its original position as shown in Figure 5. This return movement permits the extension 13 to rise and release the lever 14 for elevation by its spring 16, thereby again elevating the cylinder 19. This elevating movement is arrested by engagement of the shoulder of the cylinder 19 with a stop 38, which stop may be adjustable to fix the starting point for the descent of the cylinder. At the same time a lug 23 on the lever 3 engages an arm 29, on the actuator 5, and returns the actuator to its original position, the tip 9, thereof passing the web 10, which again snaps to position above the tip under the influence of the spring 27. It will be seen therefore that the actuation of the target trap by the lever 7, is delayed an interval after the operation of the lever 3, the duration of which is determined by the time of the descent of the cylinder 19.

Referring now more particularly to Figures 1 to 4 inclusive the lower end of the cylinder 19 is closed by a plug 30 in which the rod 22, is secured. A second rod 31 is similarly secured in the upper face of the plug 30, so as to extend upwardly therefrom.

The piston 25, is attached to the lower end of the rod 21, through the medium of a tube 32. This tube may be secured to the piston 25 and to the rod 21, in any suitable manner. The piston 25, is provided with one or more perforations 33, passing therethrough. These perforations provide passages for the fluid within the cylinder to pass from one side to the other of the piston 25, as the cylinder moves with reference thereto. The fit of the piston in the cylinder may also be somewhat loose, so that fluid may also pass between the piston and the walls of the cylinder.

Mounted for rotation on the tube 32, is a valve plate 34, provided with perforations 35, similar to the perforations 33 in the piston and which may be of the same or different size and arrangement. It will be seen that this arrangement is such that the valve plate 34, by rotation with respect to the piston 25, may take any relative position so as to partly or wholly close or obstruct the perforations 33. When the perforations 33, and 35, are in complete or partial registry the passage of the fluid therethrough is free or retarded to an extent corresponding to the size of the opening remaining. It will be clear of course that a position may be had wherein the perforations 33, are entirely closed by the plate 34.

Secured to the upper face of the plate 34, by

welding or otherwise is a plate provided with radially extending wings 36, each extending over one of the perforations 35, and being bent or inclined so as to provide an inclined surface just above each of the perforations 35. This device is for the purpose of shifting the valve plate 34. Figure 2 represents the condition within the cylinder when the same is being elevated by the lever 14. At this time the fluid is rushing upwardly through the perforations 33, and also to some extent around the rim of the piston. The fluid which passes upwardly through the perforations 33, impinges upon and raises the valve plate 34, so as to carry it clear of the upper surface of the piston. Continuing its upward movement the fluid then passes through the perforations 35, on the valve plate and impinges on the inclined under surfaces of the wings 36. The incline of these wings is so arranged that impact of the fluid thereon will cause the plate 34 to rotate on the tube 32, so as to shift its position with reference to the perforations 33, in the piston. Accordingly at the end of this movement the plate 34 again settles back to a seat upon the piston 25 in a new position with reference to the perforations 33.

It will be seen that the shift of the plate 34, accomplished by these means, is perfectly casual or haphazard and does not take place in definite steps but may have any undetermined extent and accordingly the valve plate may take any new setting with reference to the piston.

It will be noted that this manner of shifting the valve plate 34, results in successive settings thereof, with reference to the piston, which are perfectly haphazard or casual, the term casual being used herein and in the appended claims in its sense of occurring without regularity or design as distinguished from an arrangement wherein changes are by definite steps. It will also be noted that when shifted the plate 34 takes any setting with reference to the piston and accordingly the retarding means provided thereby may take any setting within the limits of its range. By this, is meant within the maximum and minimum limit of retardation, the device may be given any setting whatever, as distinguished from an arrangement in which steps of definite magnitude are interposed.

In order to insure positive operation of this device the tube 32 is provided with one or more perforations 37, so positioned, that when the cylinder has fallen a predetermined distance the upper end of the rod 31, will pass below the perforations 37. When this happens the fluid in that portion of the cylinder above the piston may rush into the tube 32, through the perforations 37, and thereby the pressure of this fluid is applied to the upper end of the rod 31. This causes a sudden drop of the cylinder 19, at the end of its travel so that the cylinder 19 strikes the abutment 26 with a pronounced impact thereby avoiding any hesitation or uncertainty in the operation of these parts.

It will be seen therefore that this invention provides means whereby an interval or delay of undetermined magnitude may be interposed in the operation of mechanism of the type described. The interval interposed may be of any magnitude whatever within the limits of the range of the device. Furthermore, different intervals follow each other in successive operations in a perfectly haphazard or casual manner, so it becomes impossible for any one to estimate or predetermine what such interval is going to be.

It will be further noted that the indexing or shifting devices which accomplish the change of interval are entirely housed within the cylinder 19, so that they are not only invisible, but inaccessible and accordingly no amount of examination of the device is adequate to disclose what the next interval will be.

While this invention has been described as applied to the operation of target traps it is obvious that it may be applied to initiate the operation of any other type of mechanism, where it is desired to interpose a delay interval.

It will also be understood that certain individual features or sub-combinations of the device may be useful by themselves without reference to other features or the complete combination and that the employment of such individual features or sub-combinations is contemplated by this invention and within the scope of the appended claims.

It is obvious that various changes may be made, within the scope of the appended claims, in the details of construction without departing from the spirit of this invention; it is understood, therefore, that the invention is not limited to the specific details shown and/or described.

Having thus described the invention, what is claimed is:

1. A device for automatically initiating the operation of mechanism, comprising, operated means, an actuator therefor, means for energizing said actuator, releasable means normally obstructing operation of said actuator, fluid retarded means for releasing said obstructing means, means for varying the retarding effect of the fluid, and automatic means operated by the fluid for shifting said varying means.

2. A device for automatically initiating the operation of mechanism, comprising, operated means, an actuator therefor, means for energizing said actuator, releasable means normally ob-

structing operation of said actuator, means for releasing said obstructing means, a fluid cylinder connected to delay the operation of said releasing means, means within said cylinder providing a retarding passage for the fluid, and a self-shifting valve movable to close said passage to variable extent.

3. A device for operating target traps comprising, an actuator for operating the trap, means for tensioning said actuator, releasable means normally obstructing the operation of said actuator, means for releasing said obstructing means including a fluid-retarded cylinder, means within said cylinder providing a retarding passage for the fluid, and means operated casually by the flow of fluid to vary the retarding effect of said passage.

4. A device for operating target traps comprising, an actuator for operating the trap, means for tensioning said actuator, releasable means normally obstructing the operation of said actuator, means for releasing said obstructing means including a fluid-retarded cylinder, means within said cylinder providing a retarding passage for the fluid, and a valve casually shiftable by the fluid to partly or wholly close said passage.

5. In a device of the character described, delaying mechanism comprising, a fluid cylinder, a piston therein, said cylinder and piston being relatively movable, means providing a fluid passage past said piston, and means casually shiftable by the fluid to vary the retarding resistance of said passage.

6. In a device of the character described, delaying mechanism comprising, a fluid cylinder, a piston therein, said cylinder and piston being relatively movable, means providing a fluid passage past said piston, a valve for said passage, and means actuated by the fluid to casually shift said valve to a variable extent.

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