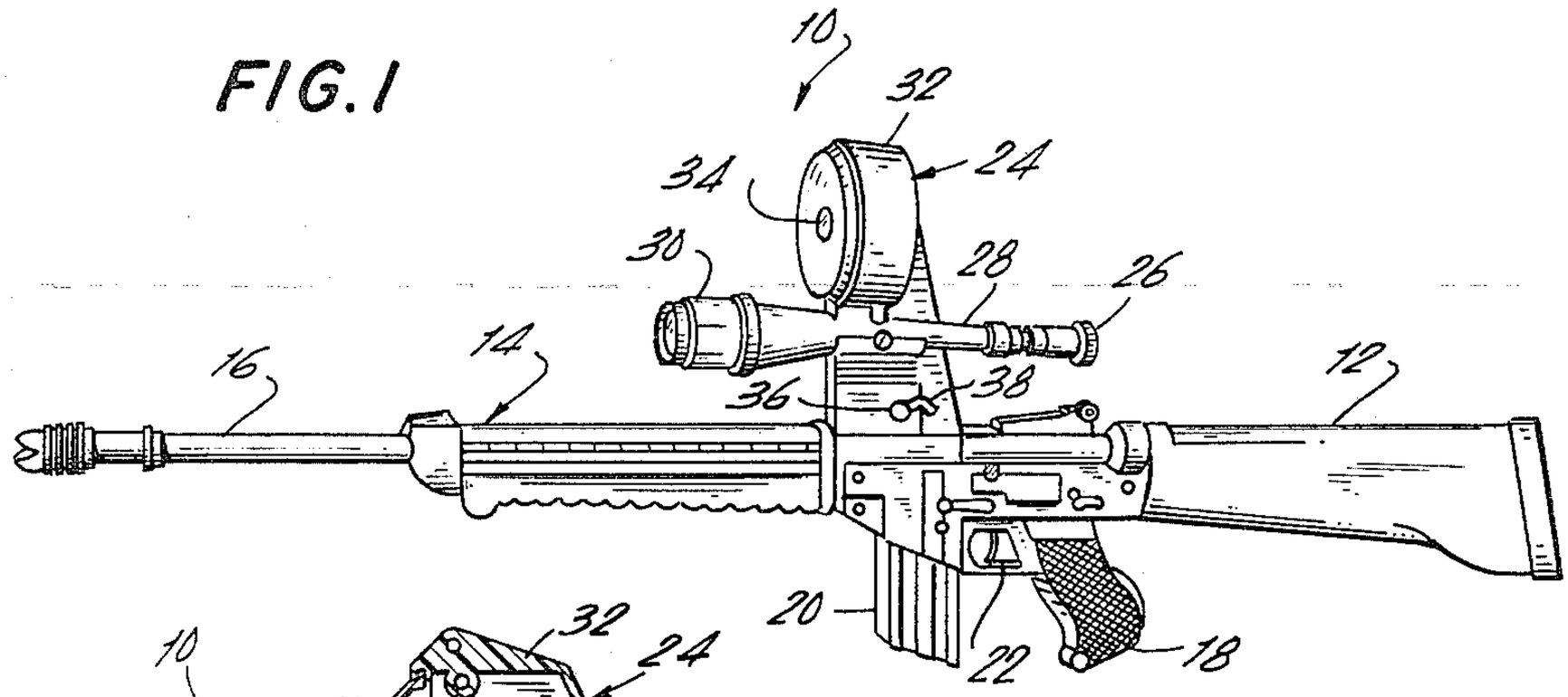
April 29, 1969 E. A. NIELSEN 3,441,270

TELESCOPE DEVICE FOR TOY GUN

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FIG. 1



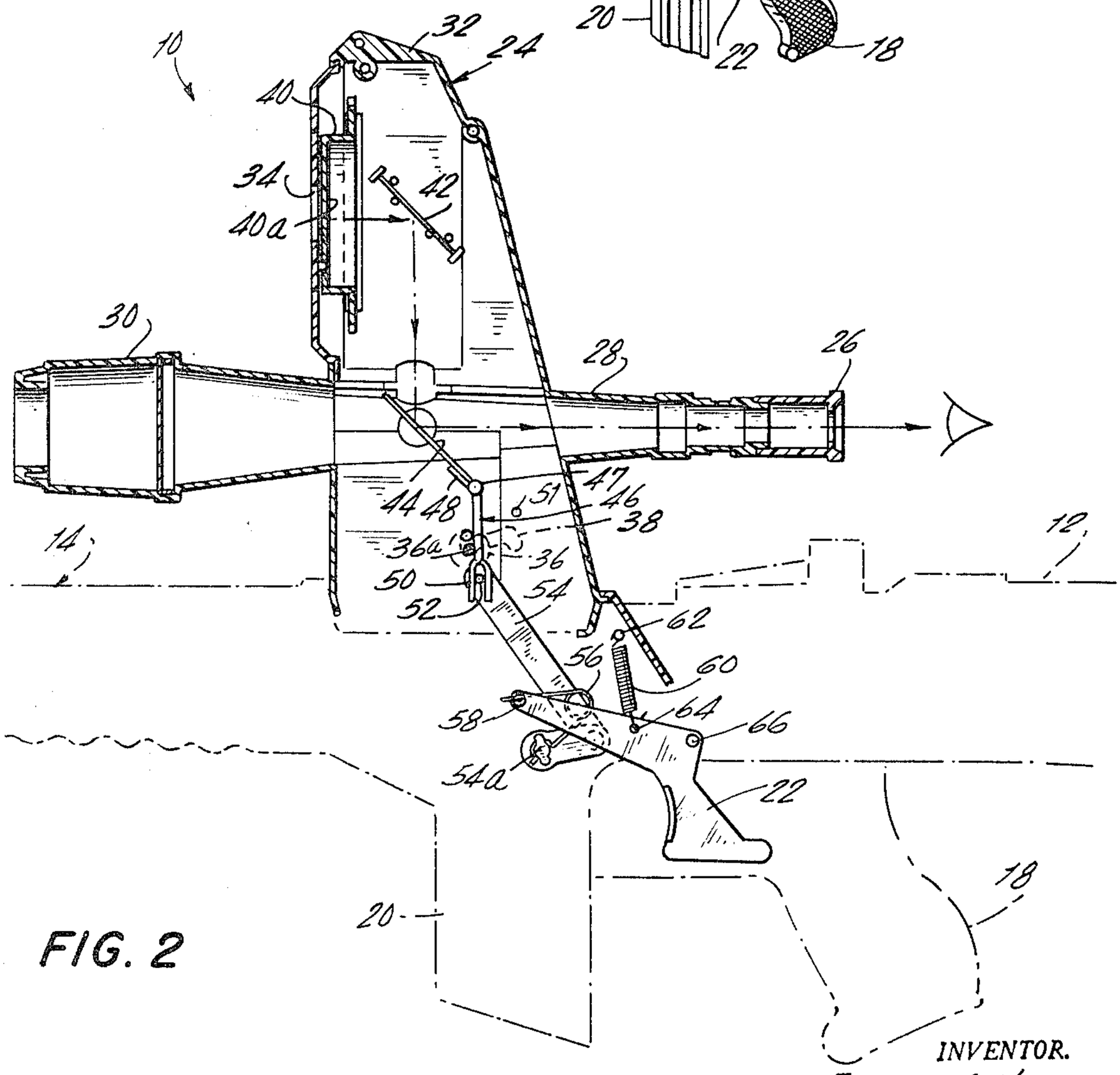




FIG. 2

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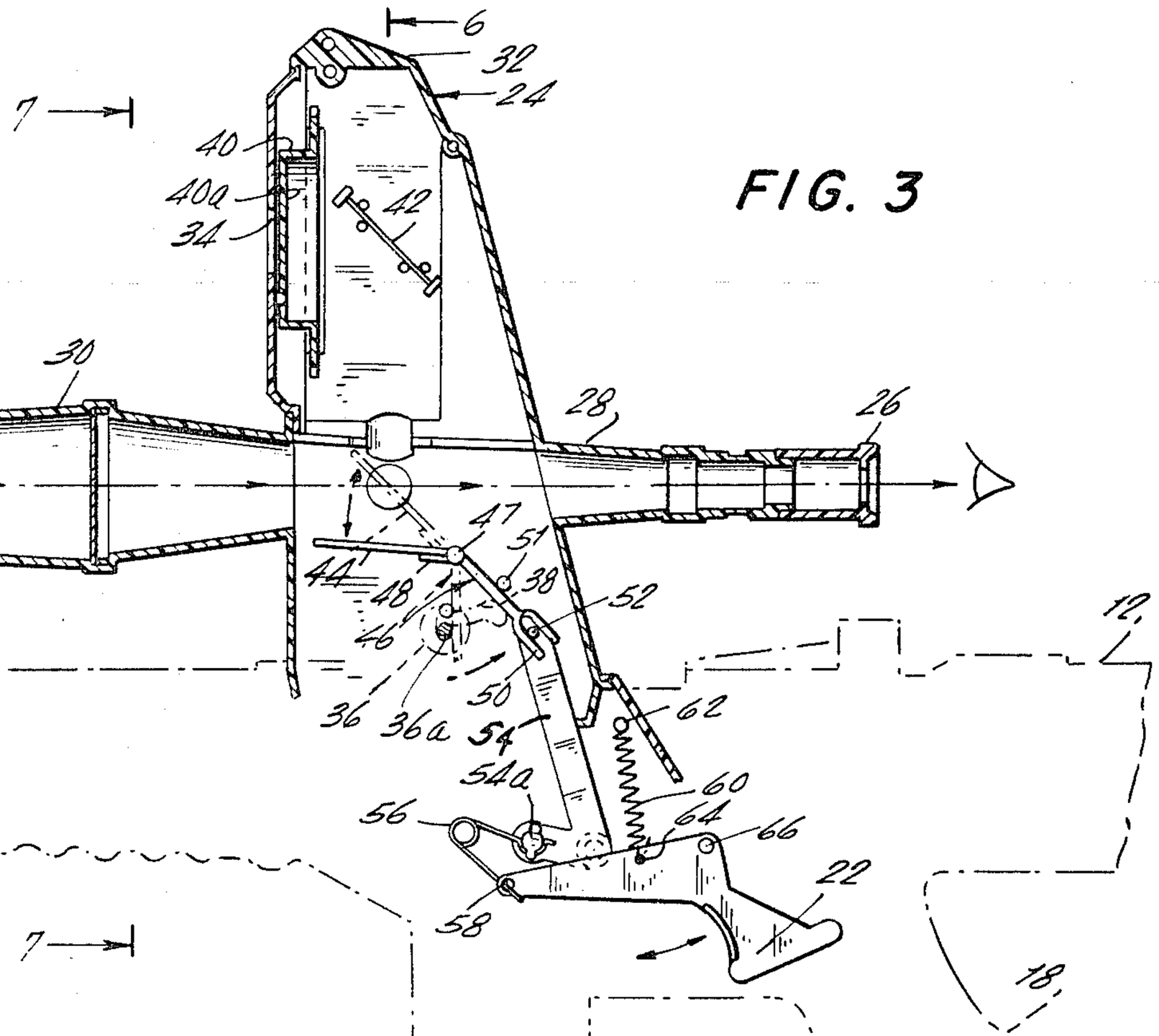
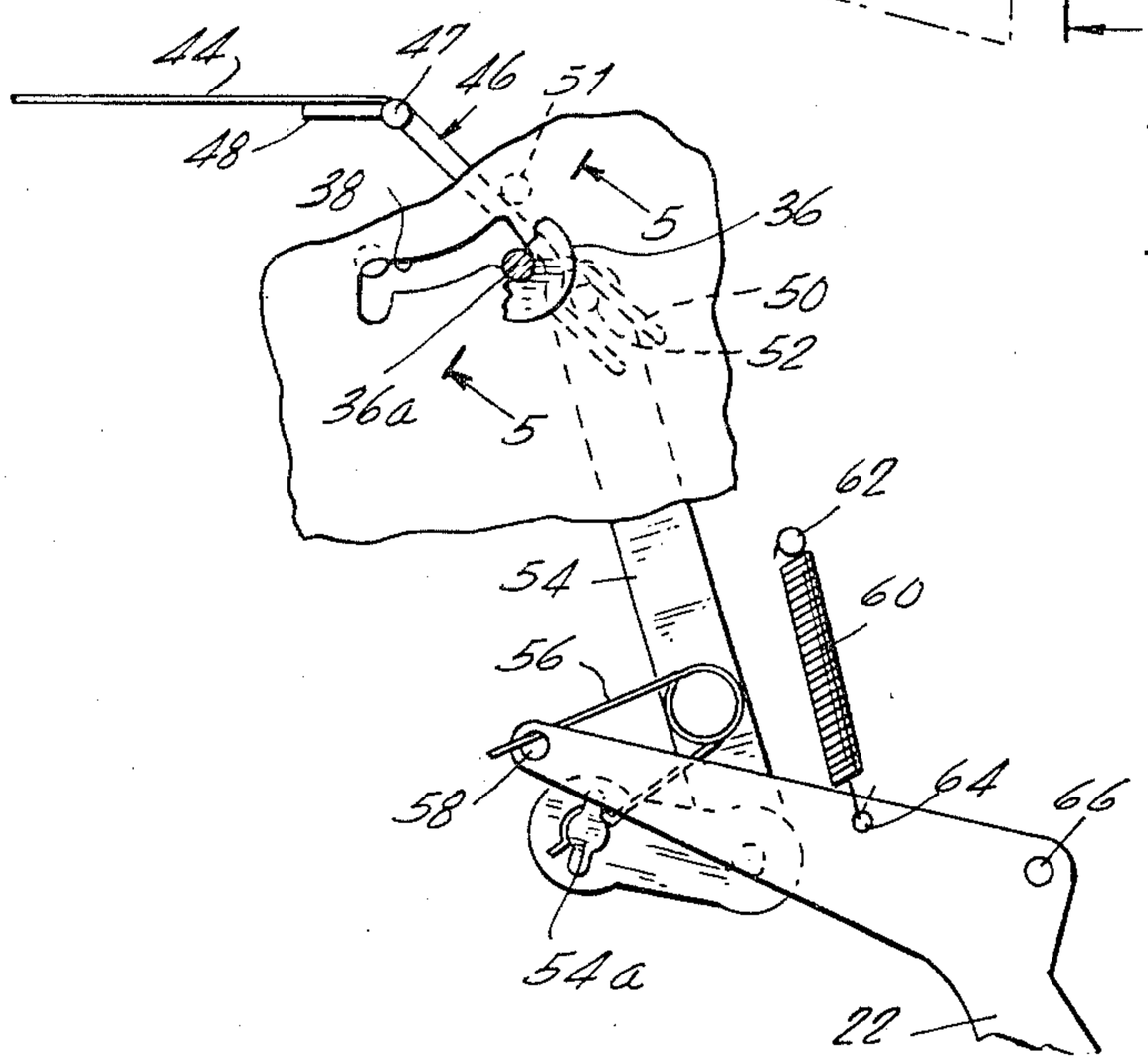



FIG. 3

FIG. 4



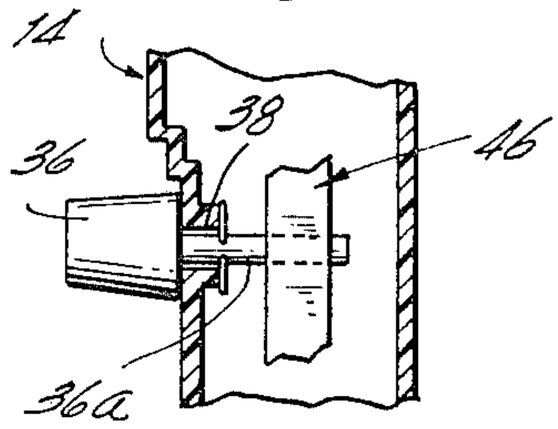




FIG. 5

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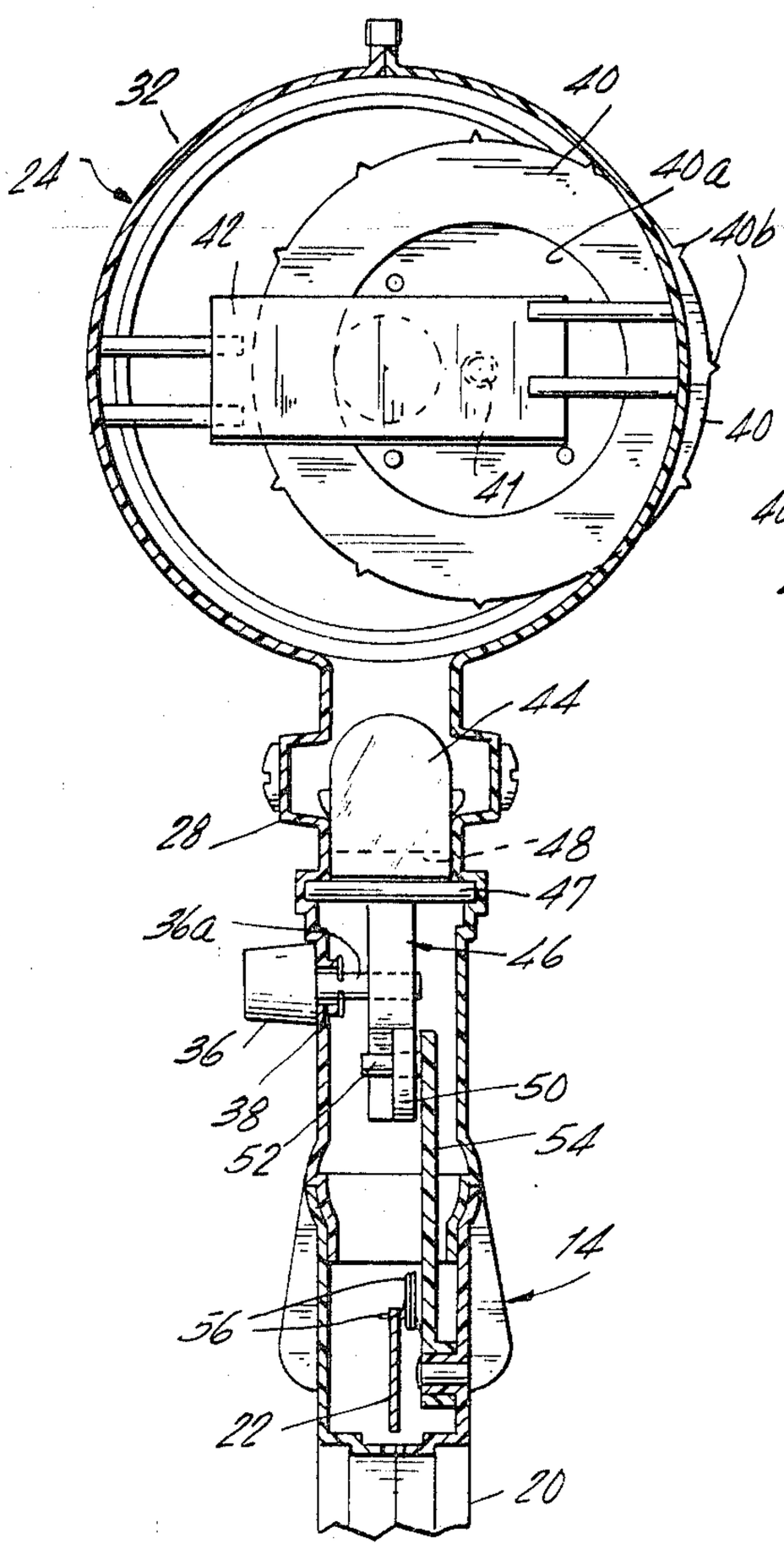



FIG. 6

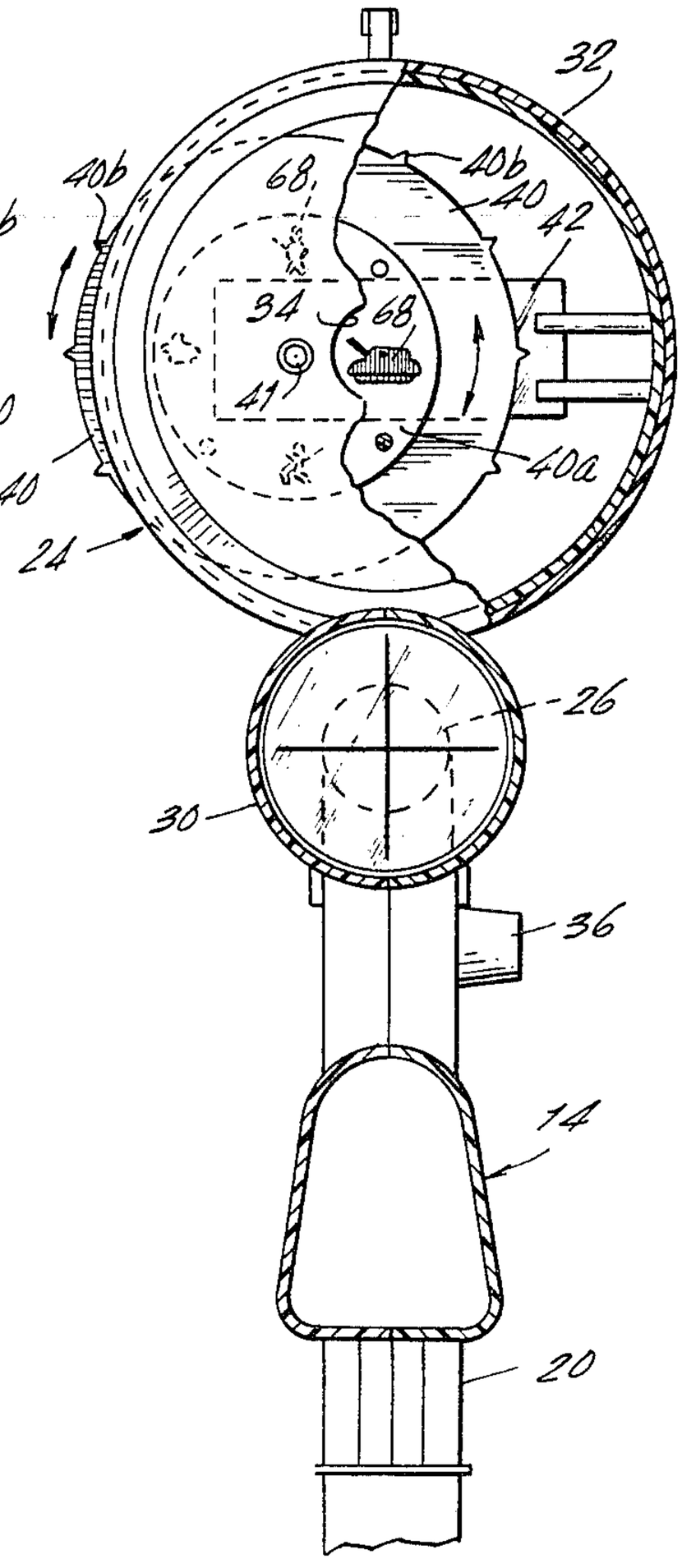



FIG. 7

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# TELESCOPE DEVICE FOR TOY GUN

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U.S. Cl. 272—8 8 Claims

## ABSTRACT OF THE DISCLOSURE

A toy gun with a built-in sighting device. In a self-contained optical housing, a stationary mirror normally reflects any one of several small target figures onto a second reflecting surface of a movable mirror. During "aiming" of the toy gun, the image is then reflected through an eyepiece. The movable mirror is mechanically linked to the trigger of the toy gun, such that pulling the trigger pivots the movable mirror out of the line of sight to the eyepiece, thereby optically eliminating the reflected target figure and simulating destruction of the target.

This invention relates to visual apparatus, and more particularly, to a multiple mode sighting device for achieving simulated target viewing in connection with a toy gun.

As the present-day toy industry has continued to burgeon, one of the most sought after goals of designers and other toy craftsmen has been what can be generally characterized as realism. Thus, regardless of what type of toy is involved, designers have strived to create products which resemble the "real-life" versions thereof as closely as possible. This emphasis has been noticeable in all types of toys, but can be particularly appreciated with respect to animated dolls, movable vehicles and toy firearms and military apparatus.

In the toy firearms category, for example, one major problem has always been the normally limited versatility of toy guns. In many such toys, there is little or no sense of the realistic, although harmless, aiming, firing and resultant effects. This has been partially due to the inability to properly depict such results without the attendant difficulty and possible harm to those in the vicinity of the toy's use. While designers have addressed themselves to this problem, there have been few fully satisfactory results. Thus, although toy guns have been designed involving the use of accompanying targets and projectiles, the disadvantages of such toys include their being cumbersome and occasionally, the problem of lost or at least poorly aimed projectiles. In addition, very few of such external target-type toys can be employed under varied lighting conditions. A generally unsatisfactory aspect of the prior art toys has often been the inability for the user of the toy to perceive any "realistic" result of the aiming and firing of the toy gun, without any attendant external equipment or possible injury associated therewith.

It is accordingly an object of this invention to provide a toy gun with a realistic sighting mechanism to permit the simulation of an actual target during the sighting and firing steps.

It is another object of this invention to furnish a self-contained viewing device relying on internal optics to achieve realistic target simulation during sighting.

It is also an object of this invention to provide a toy gun with a sighting device to permit viewing and sighting in plural modes, thereby enabling "aiming" at both actual and simulated targets.

One particular illustrative embodiment in accordance with the principles of this invention includes a self-contained telescope and reflecting sighting mechanism in-



corporated as an integral part of a toy gun. For example, the telescopic portion, including an eyepiece and a reflecting tube, can form part of a housing which is mounted upwardly from the main body of the gun, and generally centrally located between the muzzle and butt portions and, illustratively, at about the same location along the gun as is a simulated ammunition clip. The optical system embodied within the housing includes a rotatable figure wheel bearing on a viewable surface thereof several miniaturized representations of target figures, such as tanks, soldiers, etc. These simulated targets are adapted to be optically positioned, on a selective basis, opposite the reflecting surface of a stationary mirror in the upper portion of the telescopic device housing. During the aiming step, and therefore prior to the pulling of the trigger, the optical path followed by the reflected simulated target image is from the reflecting surface of the stationary mirror onto a similar reflecting surface of a second mirror which is movable. (The movement of this mirror, which is linked to the trigger mechanism, will be described below.)

Prior to the movement of the movable mirror, however, the simulated target image is further reflected from the reflective surface thereof through a conventional optical system to a telescopic eyepiece to permit the simulated aiming. When, following the selection of the appropriate target image, the viewer has appropriately centered the target image in the eyepiece, the gun is ready to be "fired."

At this point, the trigger, which is pivoted on the frame of the gun and which is also spring-connected thereto, may be pulled by the operator. This action sets in motion a sequence of mechanically linked operations which leads to the pivoting of the movable mirror out of the reflected line of sight of the previously selected target image. Thus, the trigger is linked by a spring to an angular push-arm bearing a projecting stud at its upper end. Pulling the trigger causes appropriate rotation thereof and a cam-like movement of the spring, thereby causing rotational movement of the push-arm. Since the projecting stud at the upper end of the push-arm is disposed within a bifurcated slot at the lower end of an element which holds the movable mirror, the rotation of the push-arm causes a corresponding rotational movement on the part of the mirror holder.

Consequently, the mirror is removed from the line of sight which previously provided the viewer, at the eyepiece of the telescope, with the reflected image of the simulated target. Accordingly, the simulated target has been made to disappear and give the visual effect of having been "killed" or otherwise destroyed.

This normal aiming and firing sequence (the simulated "night-fighting" mode) can be manually controlled by the selective positioning of a mode switch. This switch, when moved into the "daylight mode, causes the movable mirror to pivot out of the reflected line of sight prior to any aiming or firing steps. Accordingly, this leaves the direct optical path from the eyepiece of the telescope through to the normal objective thereof unobstructed and thereby permits direct sighting of actual physical objects under available light conditions.

It is therefore a feature of an embodiment of this invention that a movable mirror within an optical housing of a toy gun is adapted to be positioned in reflecting or non-reflecting positions to correspond to simulated aiming and firing steps respectively, wherby the destruction or disappearance of a target can be simulated.

It is still another feature of an embodiment of this invention that a rotatable figure wheel has a plurality of target figures thereon, to be reflected by internal optics to simulate actual targets during aiming.

It is still another feature of an embodiment of this

invention that pulling the trigger of a toy gun serves to remove a mirror from the line of reflected sight from a figure wheel, causing the reflected target from the figure wheel to disappear and to thus simulate hitting the target.

Still another feature of an embodiment of this invention includes a switch for preventing a movable mirror from reflecting any simulated target images and to remain out of the reflected line of sight to permit direct sighting of actual objects through an optical device.

The above brief description, as well as further objects, features and advantages of the present invention will be more fully appreciated by reference to the following detailed description of a presently preferred, but nonetheless illustrative embodiment demonstrating objects and features of the invention, when taken in conjunction with the accompanying drawings, wherein:

FIG. 1 is an overall perspective view of a toy gun in accordance with the principles of this invention, having various simulated gun portions and a telescopic housing mounted thereon;

FIG. 2 is an enlarged cross-sectional view of the telescopic device shown generally in FIG. 1, during the normal image-reflecting step accompanying aiming of the gun, the conventional portions of the gun being shown merely in outline;

FIG. 3 is an enlarged cross-sectional view of the telescopic device of the invention, shown following pulling of the trigger whereby the movable mirror has been pivoted out of the reflected line of sight, with the conventional portions of the gun being shown merely in outline;

FIG. 4 is a further enlarged and partially fragmentary view of the trigger and movable mirror linkage, with the mode switch being positioned to inhibit movement of the movable mirror into the reflected line of sight;

FIG. 5 is a sectional view of the knob and rod which can illustratively comprise the mode switch, taken along the line **5—5** of FIG. 4 in the direction of the arrows;

FIG. 6 is a sectional view of a portion of the optical reflecting system and the movable mirror linkage, taken along the line **6—6** of FIG. 3 in the direction of the arrows; and

FIG. 7 is an enlarged sectional view of a portion of the optical reflecting system of the telescopic device of the invention taken along the line **7—7** of FIG. 3 in the direction of the arrows.

A toy gun adapted for use in conjunction with the present invention is generally illustrated in FIG. 1, identified by the reference numeral **10**. More specifically, the gun **10** includes a handle or butt portion **12**, a front portion **14** which includes an illustrative barrel **16** and a typical illustrative handle **18**, which may conveniently be hollow for storage of simulated ammunition, and a simulated ammunition clip **20**. In addition, there is a trigger **22** enclosed within a typical trigger housing; the trigger is linked, as will be described hereinbelow, to various portions of a telescopic sighting device generally identified by the numeral **24** in FIG. 1.

The telescopic device **24** includes a telescopic tube **28** bearing an eyepiece **26** and a light-receiving objective portion **30**. The upper portion of the device includes a generally cylindrical housing **32** with a light entry **34** which permits available light to reflect simulated target images to a viewer through the eyepiece **26**. In addition, the gun **10** illustrated in FIG. 1 indicates a mode switch **36** disposed within two-position slot **38** to permit aiming and firing of toy gun **10** in different modes, as will also be described below.

The manner of aiming and firing the gun so as to, in the first instance, simulate target destruction by virture of the disappearance of a reflected target image, can best be appreciated by a consideration of the sectional views of FIGS. 2 and 3, together with the views of FIGS. 6 and 7. While the sectional views of FIGS. 6 and 7 are taken along the respective sectional lines with respect to FIG. 3 ("fired position of the reflecting optical system), the explanation of the reflecting of the simulated target images is the same regardless of the position of the movable mirror **44**. Thus, considering FIGS. 2, 6 and 7 together, there is a reflected image of the simulated target, such as a tank **68**, on the viewable surface **40***a* of the figure wheel **40**, which wheel is rotatable about its center pivot **41**. In order to permit available light to be used in the reflecting system, the image surface **40***a* can illustratively be made of translucent or transparent material. Accordingly, available light can then outline the simulated target, such as the tank **68** in FIG. 7, by virtue of its passage into the housing **32** of the telescopic device **24** via entry hole **34**.

When it is desired to "aim" the gun, one of the several varied simulated targets, such as the tank **68** on the viewing surface **40***a* of the figure wheel **40**, is selected by the operator by the rotation of the wheel **40**. Such rotation is made manually convenient by the provision of suitable studs or other projections **40***b* from the circumference of the wheel **40**, as well as its being eccentrically mounted within cylindrical housing **32** (i.e., while the geometrical center of enrty hole **34** substantially coincides with the center of housing **32**, the pivot point **41** around which the figure wheel **40** rotates is laterally offset from the aforementioned center).

Assuming that a particular simulated target such as tank **68** in FIG. 7 has been selected, that image is reflected, as generally illustrated in FIG. 2, off the lower reflecting surface of stationary mirror **42**. This mirror, shown from both sides in FIGS. 6 and 7, is mounted so as to reflect the target image downwardly as indicated by the vertical center line in FIG. 2. As illustrated, the image then is reflected off a similarly positioned reflecting surface of movable mirror **44**, which is held in the oblique position illustrated in FIG. 2 by a mechanical linkage to be described below, which linkage is ultimately connected to trigger **22**. This final reflection of the target image is passed through the portion of telescopic tube **28** nearest to the viewer, and emerges therefrom through eyepiece **26**. Accordingly, when a viewer "aims" the gun by looking through eyepiece **26**, a suitably selected target image, such as tank **68**, is pictured therein.

As previously noted, the movable mirror **44** is maintained in its oblique position illustrated in FIG. 2 by virtue of a linkage to trigger **22**. Specifically, this linkage includes a mirror holder **46** having a holding arm **48** to which the mirror **44** is physically attached in a suitable manner and a lower bifurcated slotted portion **50**. The projecting stud **52** of a push-arm **54** is disposed within the slot **50**, arranged substantially vertically as indicated in FIG. 2, and adapted for suitable pivotal motion. As far as the alignment indicated in FIG. 2 is concerned, however, the relative positions of push-arm **54** and its projecting stud **52**, with respect to the mirror holder **46**, are such that the mirror **44** remains in its reflecting orientation. The position of the push-arm **54** is in turn dependent upon the position of trigger **22** and its associated elements. Thus, with trigger **22** in the "unfired" position illustrated in FIG. 2, there is no urging of push-arm **54** out of the position shown. In the absence of a trigger-pulling motion by the operator, spring **60**, fixed to the gun frame at point **62** and to the trigger at point **64**, maintains the trigger in its illustrated position. Accordingly, the bent spring **56**, connected to the trigger **22** by insertion of one end of the spring **56** through aperture **58** of trigger **22**, remains as shown with respect to projecting shift lever **54***a* of push-arm **54**.

When the operator makes the decision to "fire" the toy gun, the optical steps which take place can best be visualized by noting that the mechanical and optical systems change from those illustrated in FIG. 2 to those illustrated in FIG. 3. Specifically, the pulling of trigger **22** (as generally indicated by the lowermost double arrowheaded line in FIG. 3) causes the trigger **22** to pivot about its pivot point **66**. When sufficient trigger-pulling force has been exerted to overcome the tension provided by

spring **60**, the trigger assumes the position illustrated in FIG. 3. This illustration indicates the various rotated and translated positions of the linkage between the trigger **42** and the movable mirror holder **46**. Thus, by virtue of a cam-like movement, the bent spring element **56**, coupling trigger **22** (at hole **58** therein) to shift-lever **54***a*, causes a rotational movement of push-arm **54** from the position shown in FIG. 2 to that illustrated in FIG. 3. By virtue of such a movement, the stud **52** which projects from the push-arm **54** (see FIG. 6) causes a counterclockwise rotation of the movable mirror holder **46** about its pivot point **47**. Accordingly, the mirror **44** assumes the nearly horizontal orientation illustrated in FIG. 3, the counterclockwise rotation of movable mirror holder **46** being limited by stop **51** within the telescope housing **24**.

Thus, the reflected line of sight between the selected simulated target image on the viewing surface **40***a* of the figure wheel **40** is broken by the removal therefrom of movable mirror **44**. As seen in FIG. 3, while the light can still enter at entry **34** and cause the image of the simulated target on figure wheel **40** to reflect off the reflecting surface on stationary mirror **42**, the downward reflection of that image has no optical effect, due to the substantially horizontal orientation of movable mirror **44** by virtue of the pulling of trigger **22** as described above. On the basis of such a "firing" of the gun, the viewer, looking through eyepiece **26** as indicated in FIG. 3, looks straight out through the telescopic tube **28** and the outer objective **30** and sees, assuming a blank or daylight background, for example, no target whatsoever. As far as the viewer is concerned, therefore, the previously sighted target has completely disappeared in a rapid movement, thus providing the desired simulation of target destruction. When the trigger **22** is released, permitting the mechanism to return to the position illustrated in FIG. 2, the target once again appears to the viewer through eyepiece **26**, and either additional aiming or different target selection can then occur.

As can be appreciated, it may be desired by a particular viewer to operate the toy gun independently of the simulated target images on the figure wheel **40**, and thereby take advantage of the normal sighting system, in the absence of any reflected images, through the tube **28** by virtue of aiming through the eyepiece **26**. However, the reflecting arrangement illustrated in FIG. 2 would ordinarily prevent such unobstructed sighting. Accordingly, there is provided a mode switch, which can also be denominated a "day aiming" switch, including knob **36** and inwardly projecting rod **36***a*, which rod rides along slot **38** and can be seated therein in either of two positions. In its leftmost position, illustrated in FIGS. 2 and 3, the aiming and firing described above with respect to those figures (characterized as the "night-fighting" mode) can take place. However, in the mode illustrated in FIGS. 4 and 5 (characterized as the "daylight" mode), the knob and accompanying rod have been moved to the right-hand position in the slot **38** as can best be seen in FIG. 4. The substantially vertical extension of mirror holder **46**, by virtue of the abutting relation with rod **36***a*, has been forcibly pivoted counterclockwise around pivot point **47**, much in the manner that occurred when the trigger **22** was pulled as described above. Accordingly, the mirror **44** is moved into the substantially vertical orientation illustrated in FIG. 4 prior to the pulling of trigger **22**. Once again, the movable mirror holder **46** pivots until it contacts stop **51** as illustrated in FIG. 4 and actual aiming through eyepiece **26** can then take place without any obstruction of the line of sight by reflection from movable mirror **44**.

When the trigger **22** is pulled following the movement illustrated in FIG. 4, there is merely the simulated firing effect which accompanies such trigger pulling. No visual results are presented at this time. The operator can, at any convenient time, move the mode switch back to the position illustrated in FIG. 2 and then enter into the aiming and firing sequence previously described with respect to the simulated targets on the figure wheel **40**.



It is to be understood that the above-described arrangements are illustrative of the application of the principles of the invention. Numerous other arrangements may be devised by those skilled in the art without departing from the spirit and scope of the invention.

What is claimed is:

**1**. A toy sighting mechanism comprising a tube having a viewing aperture, an optical housing including a rotatable figure wheel having at least one simulated target image thereon, entry means for allowing light into said housing and onto said figure wheel, first stationary reflecting means for reflecting an image of said at least one simulated target image, second reflecting means movable between first and second positions for reflecting said image from said first position along a line of sight to said viewing aperture to present said target image thereat and control means for moving said second reflecting means to said second position and out of said line of sight to remove said reflected image from said viewing aperture, whereby the destruction of said target image is simulated.

**2**. A toy sighting mechanism in accordance with claim **1** wherein said tube includes an entry objective adapted to permit light to pass along said line of sight to said viewing aperture when said second reflecting means is in said second position, whereby said light is blocked from reaching said viewing aperture from said entry objective when said second reflecting means is in said first position.

**3**. A toy sighting mechanism in accordance with claim **2** wherein said second reflecting means includes a mirror and said control means includes a mirror holder for carrying said mirror, said holder having a projecting arm bifurcated for at least a portion of its length and being rotatable about a fixed point, a push member having a first leg bearing a projecting stud riding within the bifurcation of said holder and a second leg rigid with said first leg and a trigger normally in a rest position whereby said mirror is maintained in said first position and adapted to be moved to a fired position whereby said mirror assumes said second position.

**4**. A toy sighting mechanism in accordance with claim **3** wherein said control means further includes a first spring coupling said trigger and said second leg of said push member to cause said push member to rotate in response to the movement of said trigger from said rest position to said fired position and a second spring for normally biasing said trigger to remain in said rest position.

**5**. A toy sighting mechanism in accordance with claim **3** including in addition a switch having a projecting rod bearing against said projecting arm and adapted to rotate said mirror holder independent of the position of said trigger, whereby said mirror is shifted into said second position to permit unobstructed viewing between said entry objective and said viewing aperture.

**6**. In a toy gun for use in simulated and actual target aiming a telescopic device comprising a telescopic viewing tube having image-receiving and viewing ends and a housing mounted on said gun and having a light-admitting opening therein, a rotatable wheel with a transparent portion bearing at least one simulated target thereon and adapted to be selectively disposed opposite said light-admitting opening, a first mirror positioned to reflect an image of said at least one simulated target by the passage of light from said light-admitting opening through said transparent portion of said wheel, a second mirror normally positioned to reflect said image from said first mirror to said viewing end of said telescopic viewing tube and positioning means for simulating the destruction of said target by moving said second mirror out of a line of sight from said image-receiving end to said viewing end of said telescopic viewing tube.

**7**. A toy gun as defined in claim **6** wherein said positioning means includes a holder affixed to said second mirror, said holder having an arm normally projecting

substantially vertically, the lowermost extension of said arm being bifurcated so as to form a slot therein, a rotatable push-arm having a projecting pin seated in said slot and adapted to thereby control the rotation of said holder, a trigger pivotable about a fixed point on said gun and a spring member linking said trigger and said push-arm such that the pulling of said trigger causes the rotation of said push-arm and said holder in opposite directions whereby said second mirror is removed from said line of sight.

8. A toy gun as defined in claim 7 including in addition a mode switch for selectively positioning said second mirror independent of said trigger, said switch including a knob projecting from said gun and a rod extending inwardly from said knob and movable from a first position abutting said arm of said holder in said substantially



vertical position to a second position whereby said holder is rotated to remove said second mirror from said line of sight.


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U.S. Cl. X.R.

46—1; 350—301