United States Patent [19]

Pachmayr

[11] **3,826,012**

[45] **July 30, 1974**

[54] **DIRECT READING GUN SIGHT ADJUSTMENT**

[76] Inventor: **Frank A. Pachmayr,** 2845 Medill Pl., Los Angeles, Calif. 90064

[22] Filed: **Dec. 28, 1971**

[21] Appl. No.: **212,929**

[52] **U.S. Cl.**..... **33/246,** 33/233, 33/254, 42/15, 116/133

[51] **Int. Cl.**..... **F41g 1/16,** F41g 1/38, F41g 11/00

[58] **Field of Search** 33/247, 248, 246, 254, 33/252, 257, 258, 259, 260, 255, 256, 241, 242, 243, 249, 233; 42/15; 116/133

[56] **References Cited**

UNITED STATES PATENTS

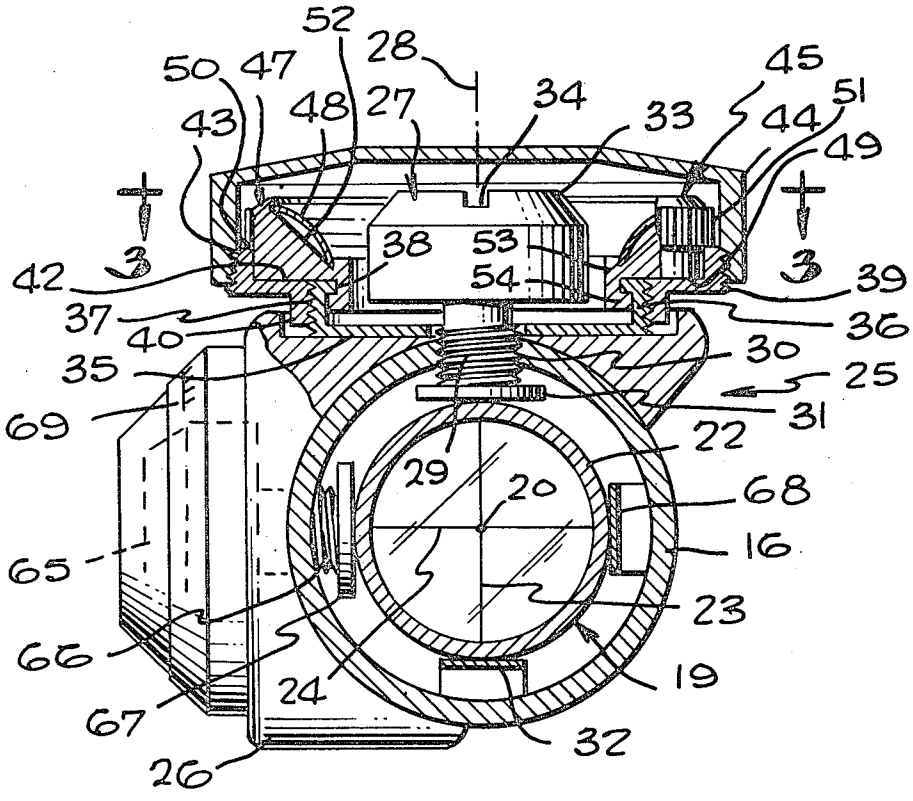
1,386,027	8/1921	Reynolds	33/248
1,801,009	4/1931	Karnes	33/235
1,970,623	8/1934	Redfield	33/258
2,345,553	4/1944	Brown et al.	33/259
3,297,389	1/1967	Gibson	33/245
3,568,323	3/1971	Lendway	33/265

Primary Examiner—Louis R. Prince
Assistant Examiner—Steven L. Stephan
Attorney, Agent, or Firm—William P. Green

[57] **ABSTRACT**

A gun sight which is adjustable to introduce a variable 'elevation' correction into the sighting of a target, and which has a scale or scales reading directly in terms of the proper gun to target distance for any particular setting of the sight.

12 Claims, 16 Drawing Figures



PATENTED JUL 30 1974

3,826,012

SHEET 1 OF 3

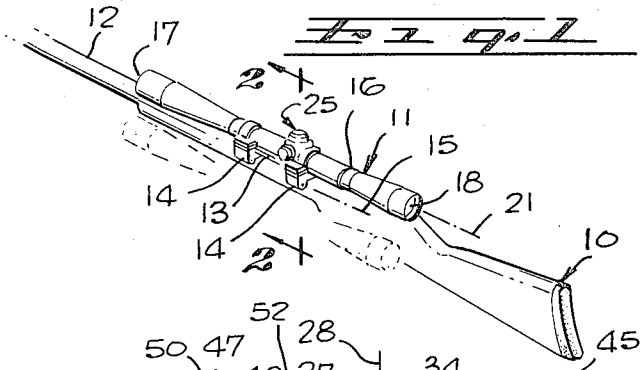


Fig. 1

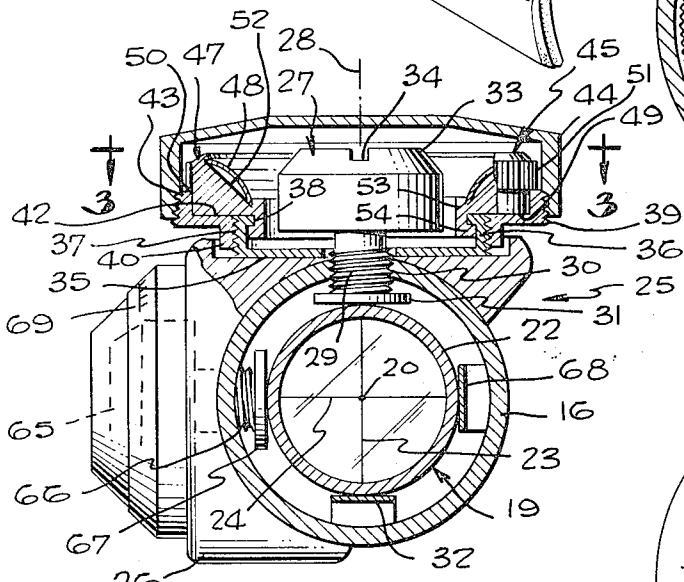


Fig. 2

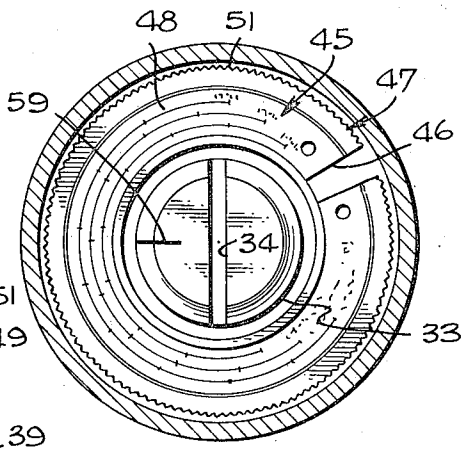


Fig. 3

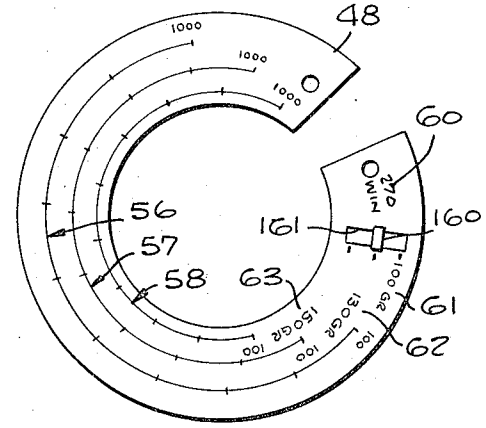


Fig. 3a

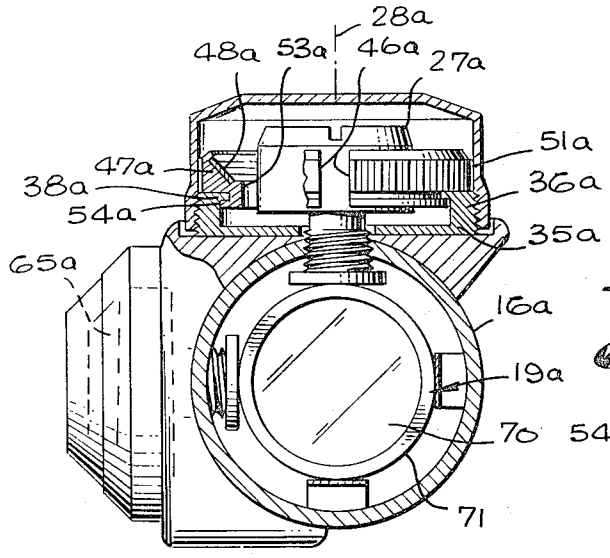


Fig. 4

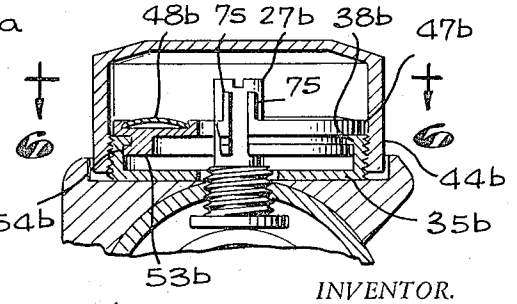


Fig. 5

INVENTOR.
FRANK A. PACHMAYR
BY
William P. Green
ATTORNEY

Fig. 6

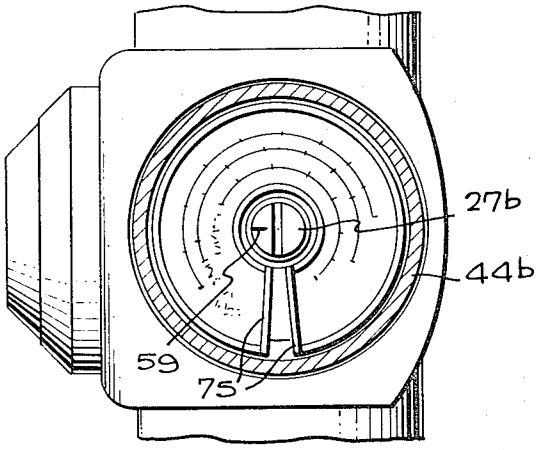


Fig. 7

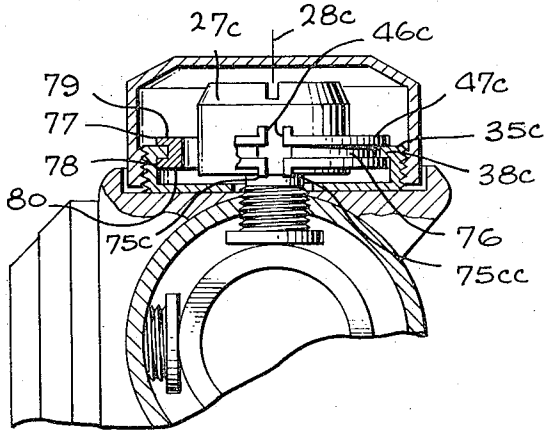


Fig. 8

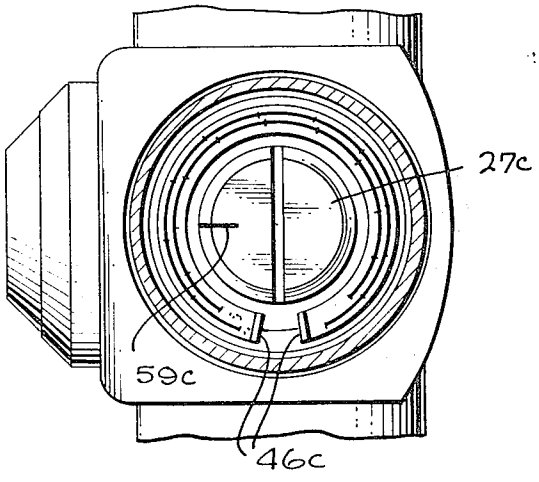


Fig. 9

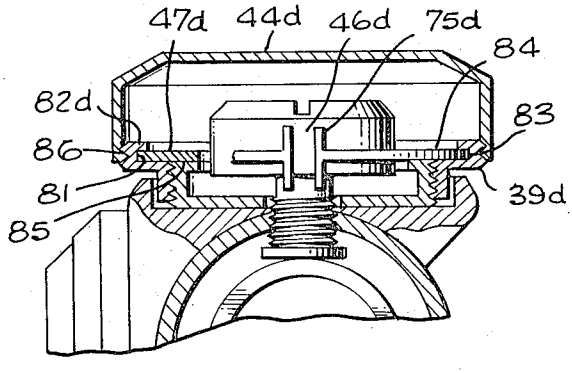


Fig. 10

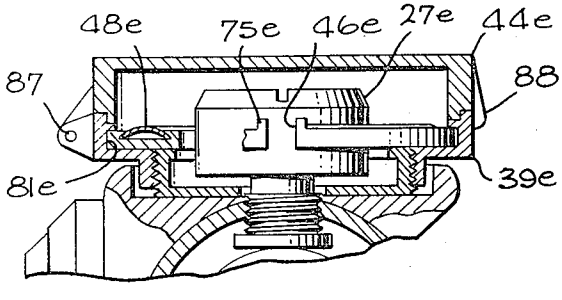
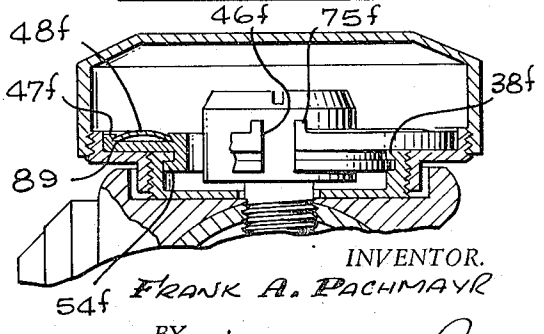


Fig. 11



INVENTOR.
FRANK A. PACHMAYR

BY
William F. Green
ATTORNEY

Fig. 12

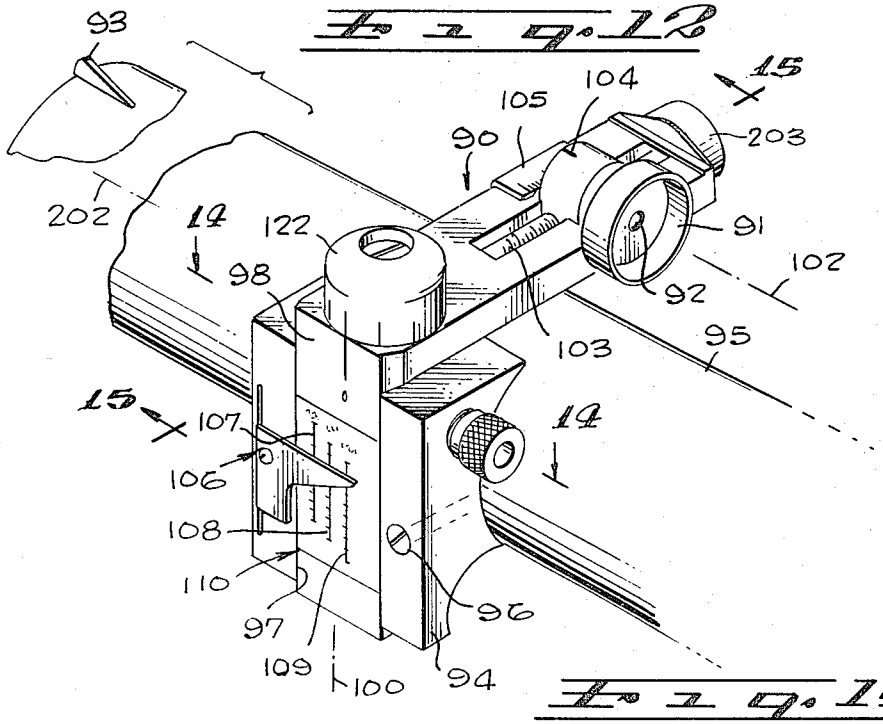
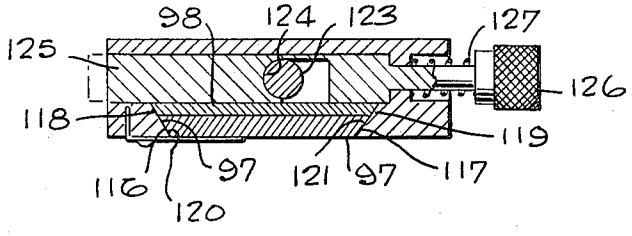
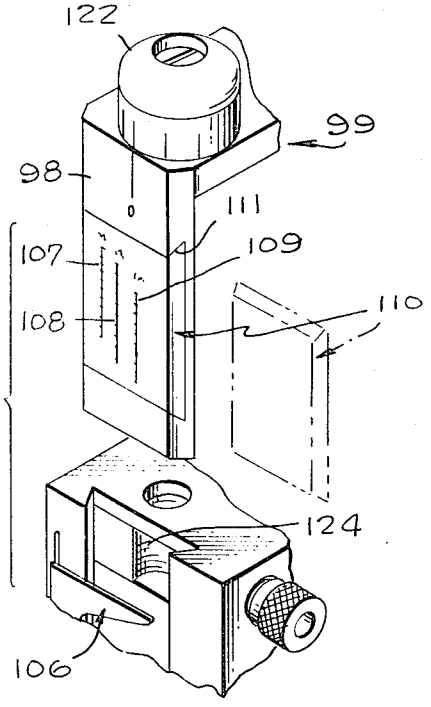


Fig. 14





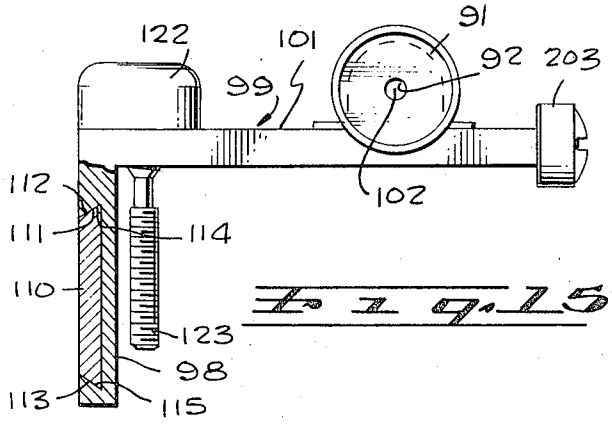


Fig. 15

Fig. 13

FRANK A. PACHMAYR
INVENTOR.

BY William P. Green
ATTORNEY

DIRECT READING GUN SIGHT ADJUSTMENT

BACKGROUND OF THE INVENTION

This invention relates generally to adjustable gun sight structures, and particularly to improved elevation adjustments for such sights.

In conventional gun sights of a type having an elevation adjustment, the elevation setting is normally indicated and read out in terms of minutes of angle. Unfortunately, however, the proper angular correction varies for different target distances, and a person using the gun must, therefore, re-estimate or recalculate the proper angular correction every time that he changes the range at which he is firing. This necessity for thus repeatedly re-estimating the proper correction angle under what may be continually changing range conditions is extremely inconvenient, and may, in hunting, introduce just enough delay in firing to allow the prey to escape before a shot can be fired.

SUMMARY OF THE INVENTION

The present invention overcomes the above discussed disadvantages of prior sight correction systems, by enabling the elevation adjustment of the sighting element to be read directly from the device in terms of gun to target distance, rather than in minutes of angle. Thus, if the target is for example 150 yards away, the user merely adjusts the sight to a predetermined 150 yard setting and is then ready to fire. At any subsequent time when the target is closer or farther away, a readjustment can be made to an appropriate changed distance setting, in extremely rapid fashion and without the necessity for any type of calculation or conversion of readings.

Optimally, the device has several different elevation scales, all reading directly in terms of gun to target distance, but offset relatively to a predetermined extent adapting the different scales for use with different types of ammunition. In addition, these scales may be designed for easy detachment from the apparatus, and replacement by one or more other similar scales adapted for direct reading with other different types of ammunition. As will appear, the scales may be retained by appropriate interfitting shoulders on a scale carrying part and a body of the sighting device, with these shoulders being shaped to allow an initial sighting-in adjustment of the scales.

Certain additional features of the invention relates to an adapter structure constructed to permit attachment of a scale or scales embodying the invention to a conventional sight assembly.

BRIEF DESCRIPTION OF THE DRAWINGS

The above and other features and objects of the invention will be better understood from the following detailed description of the typical embodiments illustrated in the accompanying drawings, in which:

FIG. **1** is a perspective representation of a gun having a telescopic sight embodying the invention;

FIG. **2** is an enlarged vertical transverse section taken on line **2—2** of FIG. **1**;

FIG. **3** is a horizontal section taken on line **3—3** of FIG. **2**;

FIG. **3***a* is a developed view showing the scale element proper of FIG. **3** separately and in flattened condition to better illustrate its three different scales;

FIG. **4** is a view similar to FIG. **2**, but showing a variational form of the invention;

FIG. **5** is a similar view of another variational form of the invention;

FIG. **6** is a horizontal section taken on line **6—6** of FIG. **5**;

FIGS. **7** and **8** are views similar to FIGS. **5** and **6**, but showing another form of the invention;

FIGS. **9**, **10**, and **11** are views similar to FIG. **2**, but showing three other forms of the invention;

FIG. **12** is a perspective view showing a non-telescopic type of gun sight constructed in accordance with invention;

FIG. **13** is a perspective view showing the vertically movable portion of the FIG. **12** device removed from the mounting element;

FIG. **14** is a horizontal section taken on line **14—14** of FIG. **12**; and

FIG. **15** is a vertical section taken on line **15—15** of FIG. **12.**

DESCRIPTION OF THE PREFERRED EMBODIMENTS

With reference first to FIG. **1**, I have illustrated at **10** a rifle having a telescopic sight **11** mounted to its barrel **12.** Sight **11** may be connected to the barrel in any appropriate manner, as by means of a bracket **13** hinged at **14** to swing about an axis **15** parallel to barrel **12** between the full line active sighting position of FIG. **1** above the barrel and the laterally and downwardly swung broken line inactive position at a side of the barrel. The sight proper **11** includes a tubular body **16** carrying appropriate lenses enabling a person using the gun to view the target area telescopically, and typically including an objective lens mounted at the forward end **17** of the tube, an ocular lens **18** carried at the rear end of the tube, and an appropriate image inverting lens positioned at an intermediate location within the tube. The telescopic sight also contains a suitable reticle unit such as that typically illustrated at **19** in FIGS. **2** for locating on the viewed area the precise point **20** at which the gun is aimed. Unit **19** is disposed in a plane which is perpendicular to the axis **21** of the telescopic sight, and in which plane the viewed image of the target area is in focus. In FIG. **2**, unit **19** is represented as including a rigid peripheral ring **22** carrying a vertical crosshair **23** and a horizontal crosshair **24** intersecting at the central point of aim **20.** Unit **19** is movable upwardly and downwardly in FIG. **2** to raise and lower the point of aim **20** relative to the viewed target area, thereby attaining an 'elevation' adjustment or correction of the sight; and is also movable leftwardly and rightwardly in FIG. **2** to shift the point of aim horizontally with respect to the viewed target area, and thereby attain a 'windage' adjustment.

For effecting the elevation and windage adjustments of reticle unit **19,** there is mounted on tube **16** of the telescopic sight an adjusting assembly **25,** which may include a rigid typically metal body or saddle **26** extending partially or completely about tube **16** and appropriately secured thereto in fixed relative position as by suitable screws (not shown). An elevation adjusting control element **27** is mounted to turn about a vertical axis **28** relative to tube **16** and the body **26,** and may have an externally threaded shank portion **29** threadedly engaging tube **16** at **30** to cause upward and downward movement of the element or knob **27** upon rota-

tion about axis **28.** At its lower end, the threaded shank **29** acts downwardly against ring **22** of the reticle unit **19,** typically through a horizontal bearing plate **31,** to adjust the unit **19** upwardly and downwardly in accordance with rotation of element **27.** A leaf spring **32** or other appropriate means are provided for resisting downward movement of unit **19,** and returning that unit upwardly upon upward movement of element **27.** To enable rotary actuation of element **27,** the upper surface of enlarged diameter portion **33** of that element may contain a screw driver slot **34** (see FIG. 3), which is adapted to receive a screw driver, coin, or the like in turning element **27.**

At its upper side, body **26** carries a part **35** which may be integral with the body or be secured thereto in rigidly fixed position, and which has an upwardly projecting essentially annular flange portion **36** provided on its outer surface with external threads **37** centered about vertical axis **28.** At the upper extremity of this flange portion **36,** part **35** has an annular radially inwardly projecting rib **38.**

To flange portion **36** of part **35,** there is mounted an adapter element **39,** having a reduced diameter portion **40** containing an internal thread engageable with external thread **37** of flange **36.** At the upper end of this portion **40,** adapter **39** has an annular radially outwardly extending horizontal portion **42,** terminating in an upwardly extending portion **43** having external threads to which the internal threads on a dust cap **44** are connected. Within adapter **39,** there is adjustably mounted a scale assembly **45,** which is annular about axis **28** except at the location of an interruption **46** at one location about its periphery (see FIG. **3**). The scale assembly includes a main essentially annular element **47** and a scale element proper **48,** both of which are interrupted at the location **46.** Element **47** has the cross section illustrated in FIG. **2,** defined in part by a horizontal undersurface **49** supported on the horizontal portion **42** of adapter **39,** and a cylindrical external surface **50** received within and confined by the upstanding portion **43** of adapter **39.** Above flange **43,** the part **47** may have an essentially annular series of knurls or serrations **51** accessible for manual grasping to turn element **47** relative to adapter **39** and control element **27.** The scale element proper **48** may be carried on an inclined annular inner surface **52** of element **47,** and have its upper and lower edges confined within suitable essentially annular notches or grooves in part **47** to removably hold element **48** in fixed position relative to part **47.**

At its radially inner extremity, part **47** has an essentially annular downwardly projecting portion **53,** carrying an essentially annular radially outwardly projecting rib **54** receivable beneath rib **38** of part **35** to hold part **47** against upward movement from the FIG. **2** position, while at the same time guiding that part **47** for only rotary motion, about vertical axis **28,** relative to adapter **39** and parts **26** and **35.** Part **47** is resiliently deformable to a constricted reduced diameter condition, by squeezing the part **47** at knurls **51** to close gap **46.** In this constricted condition, rib **54** has a small enough diameter to move upwardly past rib **38** and thereby allow removal of element **47** and part **48** from the rest of the device. When in its FIG. **2** installed condition, part **47** is urged by its own resilience radially outwardly against the inner surface of upstanding flange portion **43** of adapter **39,** with sufficient force to frictionally retain element **47** in any set position to which it may be manually turned. The part **47** may, however, be forceably adjusted rotatably against the resistance offered by this frictional engagement, either with or without slight manual constriction of part **47** to partially or completely relieve the frictional contact.

FIG. **3** shows in developed or flattened form the type of indicator markings which are provided on the scale element **48.** These markings desirably include several, typically three, scales **56, 57,** and **58,** coacting with an index marking **59** on control element **27,** with each of the scales reading directly in terms of the proper gun to target distances for the different settings of element **27.** With reference for example to the scale **56** of FIG. **3,** the markings "100," "200," etc. of that scale represent different target distances of 100 yards, 200 yards, 300 yards, etc., from the gun to a particular target being fired at. When index marking **59** is opposite a particular one of these markings, this indicates that the telescopic sight has been adjusted for an elevation correction which is exactly proper for that particular firing distance.

The three scales **56, 57,** and **58** give proper range readings in this manner for three different types of ammunition, say for example ammunition having three different bullet weights, all of the same caliber. In the typically illustrated arrangement, the marking at **60** in FIG. **3** indicates that the scales are for use with a "270 Winchester" caliber gun, with scale **56** being applicable to bullets of that caliber having a weight of 100 grains, as indicated at **61,** while the markings of scale **56** apply to bullets of the specified caliber having 130 grains weight (see **62**), and scale **58** applies to bullets of **150** grains weight but still of the same caliber (see **63**). If a bullet or bullets of other calibers or weights are to be employed, the part **48** may be removed and another similar part of different markings may be connected to element **47.** At a location opposite the markings **61, 62,** and **63,** element **48** may carry a shiftable indicator button or marker **160** which is slidable within a radial slot **161** in part **48** to positions opposite the three markings **61, 62,** and **63** selectively, and is frictionally retained in any position to which it is set, to remind the user which of the three indicated types of ammunition is being used.

The windage adjustment of reticle unit **19** may be effected by a mechanism including a control element **65** similar to the elevation controlling element **27,** threadedly engaging tube **16** and/or body **26** at **66,** and acting through a bearing plate **67** to actuate unit **19** rightwardly in FIG. **2** against the influence of a return spring **68.** An appropriate scale **69** surrounding element **65,** reading in minutes of angle, coacts with an index marking or element **65** to indicate the windage correction angle which is attained at any particular setting of element **65** and unit **19.**

When the telescopic gun sight of FIGS. **1** to **3** is first mounted on a gun, the device must of course be initially 'sighted in' in order to adjust the scale part **48** to a proper rotary setting relative to adapter **39.** For this prupose, the user of the gun fires a number of cartridges of a known caliber and weight (a caliber and weight for which there is a scale on element **48**), with all of those cartridges being fired at a particular measured distance from the target, say for example **100** yards, and all desirably being fired when there is no wind in the vicinity. The control elements **27** and **65**

are then adjusted until the gun, when fired at the specified range, consistently hits the exact target location at which the reticle intersection **20** is aimed. In this setting, the sight is properly corrected for elevation at that **100** yard firing distance. With the telescopic sight thus set, element **47** and its carried scale part **48** are manually constricted very slightly and turned within adapter **39** to a position in which the 100 yard marking on the appropriate one of the three scales **56, 57,** or **58** is directly opposite the index marking **59** on element **27.** Thereafter, the scale is frictionally retained in this position, in which all of the other markings on the three scales are automatically located properly to give correct target distance readings for the particular types of ammunition for which the three scales have been calibrated.

FIG. **4** shows a variational arrangement which is very similar to that of FIGS. **1** to **3,** except that the adapter **39** is omitted, and the scale carrying element **47***a* and the scale element proper **48***a* are connected directly though adjustably to the upstanding flange portion **36***a* of stationary part **35***a*. More particularly, element **47***a* has a downardly projecting portion **53***a* forming an annular rib **54***a* receivable beneath an inturned annular rib **38***a* formed at the upper edge of flange **36***a*, to retain element **47***a* in the FIG. **4** position relative to tubular body **16***a* of the telescopic sight, while allowing rotary adjusting movement of element **47***a* and the carried element **48***a* about vertical axis **28***a* of rotary control element **27***a*. Parts **47***a* and **48***a* are interrupted at **46***a* as in the first form of the invention, to enable constriction of these parts to a condition in which they are upwardly removable from the rest of the apparatus when desired. As in the first form of the invention, the resilience of part **47***a* urges it radially outwardly against flange **36***a* of part **35***a* sufficiently tightly to retain element **47***a* frictionally in any position to which it may be set, but with part **47***a* and the carried part **48***a* being forceably adjustable rotatably to any new setting by manual grasping and slight constriction of the knurls **51***a* on part **47***a*. The scale markings on element **48***a* are the same as those shown in FIG. **3,** resding directly in terms of gun to target distance, so that the user can set the sight very easily, quickly and directly for any particular range without the necessity for calculating or estimating a proper correction in terms of angles rather than distances.

The adjustable sight element **19***a* of FIG. **4** which is actuable upwardly and downwardly by control element **27***a*, and is actuable laterally for windage adjustment by a second control element **65***a*, is typically illustrated as taking the form of a lens **70** contained within and carried by an annular ring **71.** In this arrangement, the reticle corresponding to crosshairs **23** and **24** of FIG. **2** is located at another point along the length of the telescopic sight, and is fixed relative to and not adjustable relative to that tube. The apparent position of the crosshair intersection relative to the telescopically viewed target area in FIG. **4** is shiftable by the discussed movement of lens **70** under the control of elements **27***a* and **65***a*. This type of arrangement in which the adjustable sight element is a portion of the lens system is well known, and therefore will not be described in any further detail. In FIG. **4,** the dust cover **44***a* may be threadedly connected to the external threads on flange **36***a*, and extend upwardly past and in close proximity to knurls **51***a* of element **47***a*. The operation of the FIG. **4** arrangement is the same as that of FIGS. **1** to **3.**

FIGS. **5** and **6** show another form of the invention in which the element **47***b* corresponding to element **47** of FIG. **2** extends horizontally across the upper side of part **35***b*, having a downwardly projecting portion **53***b* with a radially projecting essentially annular rib **54***b* interfitting with an annular rib **38***b* on part **35***b* to retain element **47***b* as previously discussed. At its upper side, element **47***b* carries a removable scale part **48***b*, whose inner and outer edges may be confined within suitable confining notches or grooves in part **47***b*. Element **48***b* has at its upper side a number of target distance scales such as those shown at **56, 57,** and **58** in FIG. **3,** and has at its underside a second series of different scales (still all marked off in distances), so that element **48***b* can be inverted as desired to present any of the various scales on either of its sides for coaction with the index marking **59***b* on control element **27***b*. Element **48***b* has some resilience to tend to assume a flattened condition and thereby remain by its own resilience in the retained condition of FIG. **5.**

In FIGS. **5** and **6,** the control element **27***b* has been altered to present an upper reduced diameter portion **74** about which elements **47***b* and **48***b* are receivable, to thus allow for greater radial extent of the scale part **48***b* and thereby enable inclusion of more scales thereon. Also, parts **47***b* and **48***b* are interrupted as in the other forms of the invention at **46***b*, and may be constrictable inwardly for removal by providing upwardly projecting finger tabs **75** on the opposite ends of element **47***b* adapted to be easily squeezed together to constrict that element. The dust cover **44***b* is threadedly connectible to part **35***b* at **37***b*, and extends about and encloses the scale parts and control element **27***b*. As in the other forms of the invention, the resilience of part **47***b* holds it against part **35***b* sufficiently tightly to retain the scale frictionally in any position to which it may be set.

FIGS. **7** and **8** show still another form of the invention, which may be essentially the same as that of FIG. **4** except that the scale element **47**c is of the illustrated changed configuration. Element **47***c* has a reduced external diameter vertically intermediate portion **76** forming a groove receiving an annular rib **38***c* of part **35***c*, to locate part **47***c* for rotary adjustment about a vertical axis **28***c*. Element **47***c* is interrupted at **46***c*, permitting sufficient constriction thereof against its resilience to allow its removal and inversion between either of two positions, so that either of the two ribs **77** or **78** may be located at the upper side of the device. Two sets of finger tabs **75***c* and **75***cc* are accessible in these two relatively inverted positions respectively of element **47***c*, to enable manual constriction of that element to its removal condition, or to a slightly reduced diameter condition for releasing the frictional lock between element **47***c* and part **35***c* and facilitating rotary adjustment of element **47***c*. Two different sets of target distance scales are provided on the two surfaces **79** and **80** of part **47***c*, for coaction with index marking **59** *c* on rotary control part **27***c*, so that in either of its inverted conditions, the scale part **47***c* may be employed with appropriate selected types of ammunition for indicating directly the proper elevation correction for any given target distance.

In the FIG. **9** arrangement, part **47***d* is flat and disposed horizontally and is essentially annular except at

the location of an interruption 46*d* at which upwardly and downwardly directed finger tabs 75*d* are provided to facilitate constriction of element 47*d* to withdraw its circular peripheral edge 83 out of an annular groove 81 formed in adapter 39*d* beneath an annular rib 82*d*. As will be apparent, the part 47*d* is usable in either of two relatively inverted positions, and may have two series of different scales on its upper and lower surfaces 84 and 85, with one of these series of scales giving the proper target distances for a number of different bullet weights at a predetermined caliber, while the other series of scales gives the proper target distances for another group of bullet weights still typically at the same caliber. The dust cover 44*d* is threadedly connected to adapter 39*d* at 86, by threads which in this instance may typically be of the quarter turn quick disconnect type.

In the FIG. 10 arrangement, the annular peripheral edge of element 47*e* is again confined and located within an annular groove 81*e* formed in adapter 39*e*, and is circularly discontinuous at 46*e* and constrictable for rotary adjustment or removal from the groove by finger tabs 75*e*. A scale element 48*e* has a number of direct reading target distance scales similar to scales 56, 57, and 58 in FIG. 3*a*. The dust cover 44*e* in FIG. 10 is represented as hinged at 87 to swing upwardly and laterally to a position exposing the scales and control element 27*e* for use, with the cover being releasably retained in closed position by an appropriate latch represented at 88.

The FIG. 11 arrangement is substantially the same as that of FIGS. 1 to 3, except that element 47*f* extends essentially horizontally and carries scale element 48*f* in a generally horizontal though bowed condition, retained at its edges 89 within appropriate essentially circular notches in part 47*f*, and being removable and reinsertible in an inverted position exposing a second series of scales on element 48*f* for use. Finger tabs 75*f* allow constriction of element 47*f* at 46*f*, to release the essentially annular rib 54f from beneath rib 38*f* for removal.

FIGS. 12 to 15 show another variational type of gun sight 90, which in this case is of a non-telescopic type, having a 'peep sight' element 91 containing a small opening 92 through which a forward gun sight 93 is viewed, in a manner aligning the sights on a target to aim the gun. The assembly 90 includes a mounting part 94 which is suitably secured to gun action 95 in fixed position relative thereto, as by a screw or screws 96, and which contains a vertically extending dovetail guideway 97 within which a correspondingly dovetail shaped vertical portion 98 of a part 99 is received and guided for upward and downward movement along a vertical axis 100. At the upper end of portion 98, part 99 has a horizontally projecting portion 101 to which the peep sight 91 is mounted for lateral adjusting movement transversely of the sighting axis 102 in response to rotation of an adjusting screw 103, which threadedly engages element 91 and has a head 203 by which the screw is turned manually or by a screw driver or other tool. The lateral position or windage adjustment of the peep sight may be indicated by the setting of an index marking 104 on the peep sight element relative to a windage scale 105 on part 99.

For indicating the vertical position of the peep sight relative to the gun barrel, and thus indicating the 'elevation' setting of the device, mounting part 94 carries an index marker 106 coacting with a series of elevation scales 107, 108, and 109 formed on the front face of a scale part 110 which may be removably attached to portion 98 of element 99. More particularly, this part 110 may be received within a horizontally extending dovetail guideway 111 (FIGS. 13 and 15) formed in vertical portion 98 of part 99. As will be apparent, the engagement of upper and lower dovetail faces 112 and 113 of part 110 with the corresponding dovetail faces 114 and 115 of portion 98 of part 99 guide element 110 for only horizontal movement relative to portion 98, parallel to barrel axis 202. Further, when portion 98 and part 110 are received within the vertical dovetail recess or guideway 97 in mounting part 94, part 110 is effectively locked in fixed position within horizontal guideway 111 and against removal therefrom. For this purpose, the part 110 has at its opposite sides (as viewed in FIG. 14) two dovetail shaped faces 116 and 117 which are disposed at an angle corresponding to and are aligned with the dovetail faces 118 and 119 of portion 98 of part 99, and are engageable with the dovetail shaped side walls 120 and 121 of guideway 97 to lock part 110 in position. The three scales 107, 108, and 109 on part 110 extend vertically and parallel to one another, and may correspond to the three scales 56, 57, and 58 of FIG. 3*a*, to indicate the elevation settings of sight 91 in terms of gun to target distance, and for three different types of ammunition, such as the three different weights of bullet indicated at 61, 62, and 63 in FIG. 3*a*. The types of ammunition for which the three scales are usable may be appropriately marked at the tops of the scales. Additional similar scales for use with other types of ammunition may be provided on one or more other elements such as that shown at 110, which may be substituted for one another by merely sliding part 99 upwardly far enough to expose the entire horizontal dovetail guideway 111, and then sliding that part 110 out of guideway 111 and inserting another similar part, following which the entire assembly may be moved downardly to the FIG. 12 position for use. If desired, still another part 110 may be provided reading more conventionally in terms of minutes of angle rather than in terms of gun to target distance as contemplated by the present invention.

The vertical elevation adjustment of part 99 is effected in use by rotation of a knob 122 carrying a downardly projecting threaded screw or shank 123 which may be releasably engageable with a half-nut 124 formed on a part 125 carried movably by mounting element 94. As seen in FIG. 14, this half-nut 124 is actuable leftwardly in that figure out of engagement with the adjusting screw shank 123 by manual leftward depression of an operating head 126 against the tendency of a spring 127. When the element 124 is moved leftwardly out of engagement with shank 123, the entire element 99 may be withdrawn upwardly for removal of one of the parts 110 and substitution of another, after which the entire assembly can be pressed downwardly again into guideway 97, and element 126 can then be released to allow half-nut 124 to move into engagement with shank 123 so that rotation of knob 122 will effect the desired vertical adjustment of part 99.

While certain specific embodiments of the present invention have been disclosed as typical, the invention is of course not limited to these particular forms, but rather is applicable broadly to all such variations as fall within the scope of the appended claims. Any of nu-

merous other types of both telescopic and non-telescopic sights can be adapted to give elevation settings in terms of gun to target distances in a manner similar to the arrangements specifically described hereinabove.

I claim:

1. In a gun sight structure including telescopic sighting means having an adjustable sight element which is movable in a predetermined direction to introduce a variable elevation correction into the sighting of a target, a rotary adjusting part mounted to be turned about a predetermined axis and operable upon rotation to move said element to a series of different elevation settings, and a second part near said rotary adjusting part and which does not turn therewith; the improvement comprising a plurality of scale members, means for detachably connecting said scale members selectively and interchangeably to one of said parts at a location to coact with index means associated with the other part in indicating elevation, different caliber markings on said different scale members respectively indicating different caliber bullets for which said members respectively are to be used, a plurality of essentially arcuate scales formed on each of said scale members and each reading directly in terms of proper gun to target distances for which said rotary part is adjusted in different settings thereof, said scales of each scale member being staggered circularly about said axis in a relation giving gun to target distance readings for bullets of different weights respectively but all of the same particular caliber identified by the one of said caliber markings which is on that particular scale member, and additional marking means on each of said scale members indicating said different bullet weights for which each of said scales is to be used.

2. The improvement as recited in claim **1**, in which said connecting means are constructed to attach each of said scale members to said one of said parts in a relation enabling initial sighting-in adjustment of the scale members about said axis relative to said one part, with ultimate retention in a desired adjusted position.

3. The improvement as recited in claim **1**, in which said scale members are essentially circular to extend essentially circularly about said axis in use.

4. The improvement as recited in claim **1**, in which said scale members are essentially circular and have portions interfitting with said one part in arcuate projection and groove relation, said scale members being circularly discontinuous and resiliently distortable radially of said axis in a relation moving said interfitting portions into and out of interfitting relation to attach an individual one of said scale members to or detach it from said one part.

5. The improvement as recited in claim **1**, including an essentially circular carrier disposed about said rotary adjusting part for attaching one of said scale members to said second part, said carrier and said second part having interfitting essentially arcuate shoulders mounting said carrier to said second part for relative adjusting movement and frictional retention in a desired adjusted position, said carrier being circularly discontinuous and resiliently radially distortable to a condition in which it is separable from said second part.

6. The improvement as recited in claim **5**, in which said carrier has an irregularized external surface exposed for contact by a users fingers in turning the carrier relative to said second part.

7. The improvement as recited in claim **1**, in which said second part has a tubular portion with external threads and an internal arcuate shoulder, there being an adapter having a reduced diameter portion with internal threads engaging said external threads of said tubular portion of said second part, said adapter having an enlarged diameter portion, there being a carrier member disposed about said rotary part and received within said enlarged diameter portion of said adapter and rotatably adjustable relative thereto and having an arcuate flange engaging said arcuate shoulder of said second part, said carrier being adapted to carry one of said scale members in a position of extension about said rotary part, said carrier being circularly discontinuous and resiliently radially constrictable to a condition allowing removal thereof from said tubular portion of said second part.

8. The improvement as recited in claim **7**, in which said carrier has an irregularized external surface beyond said enlarged diameter portion of said adapter exposed for manual actuation, said enlarged diameter portion of said adapter having external threads, and there being a dust cover connected to said external threads and enclosing said rotary part.

9. The improvement as recited in claim **1**, in which said second part has a tubular portion disposed about said rotary part and having external threads, there being an adapter having a reduced diameter internally threaded portion engaging said external threads of said second part, said adapter having a larger diameter portion within which said scale members are detachably and interchangeably mountable by said connecting means.

10. The improvement as recited in claim **9**, in which said connecting means include an essentially circular but circularly discontinuous carrier to which said scale members are connectable and which is resiliently constrictable to a reduced diameter condition for attachment to and separation from said second part and adapter.

11. The improvement as recited in claim **1**, in which said scale members are essentially circular and circularly discontinuous and resiliently radially constrictable to conditions enabling attachment to and detachment from said one part, said discontinuous essentially circular members having tabs at their opposite ends for constricting said members radially.

12. In a gun sight structure including an adjustable sight element which is movable in a predetermined direction to introduce a variable elevation correction into the sighting a target, a movable adjusting part operable to actuate said element to a series of different elevation settings, and a second part near said adjusting part and which does not move therewith; the improvement comprising a plurality of scale members, means for detachably connecting said scale members selectively and interchangeably to one of said parts at a location to coact with index means associated with the other part in indicating elevation, different scales formed on said different scale members respectively and each reading directly in terms of proper gun to target distances for which said adjusting part is set in different positions thereof, said scales of the different members being calibrated to give gun to target distance readings for different types of ammunition, and markings on said scale members indicating said different types of ammunition with which the different scale members are used.

* * * * *