No. 701,870.

Patented June 10, 1902.

R. GEELHAAR.

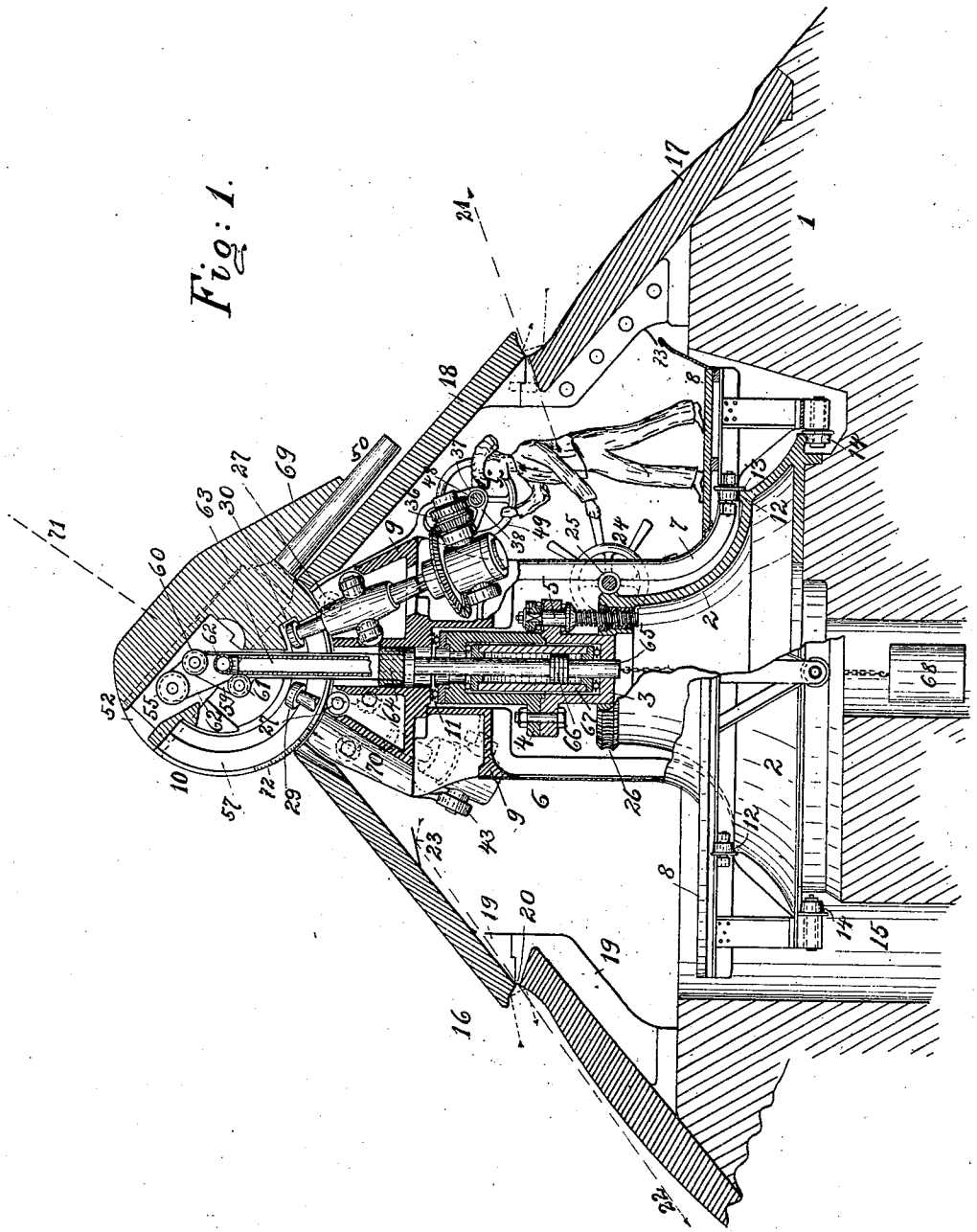
ARMORED GUN TOWER.

(Application filed May 22, 1901.)

(No Model.)

3 Sheets—Sheet 1.

Fig. 1.



WITNESSES:

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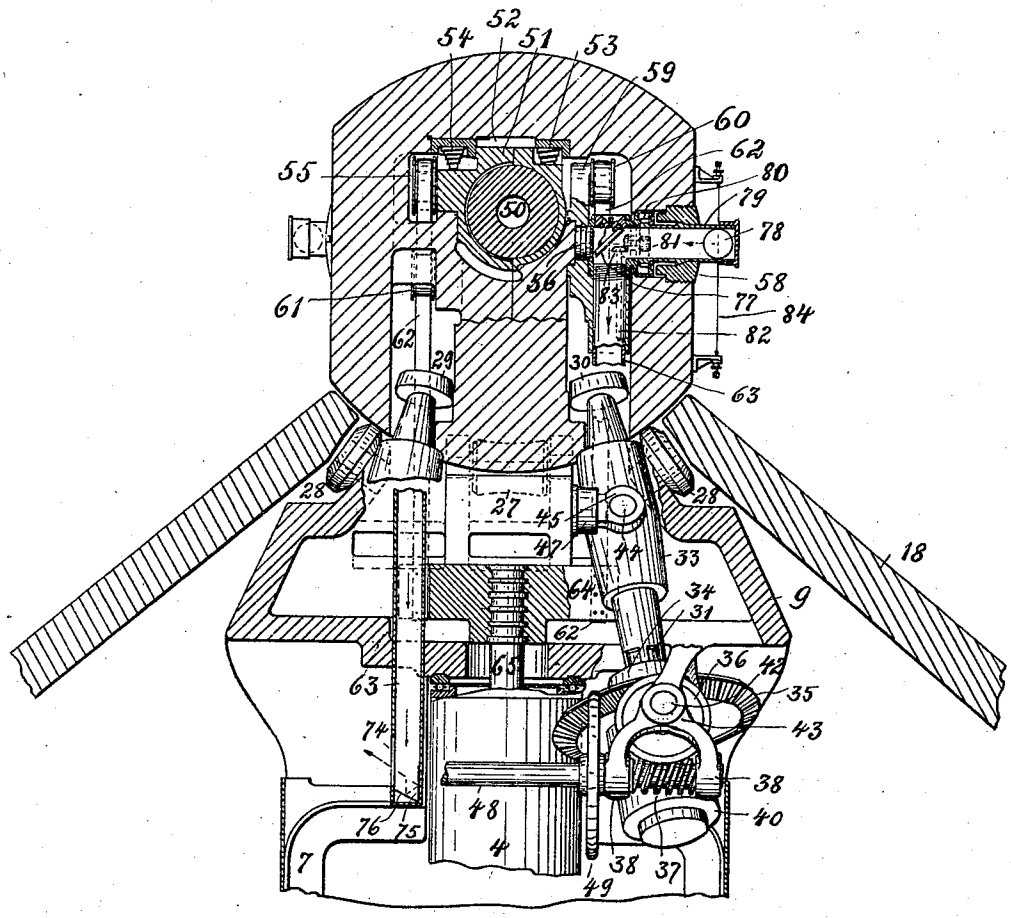
(No Model.) 3 Sheets—Sheet 2.

Fig: 2.



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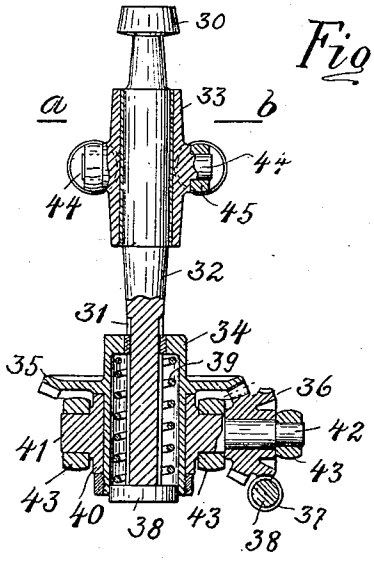

Fig: 3.

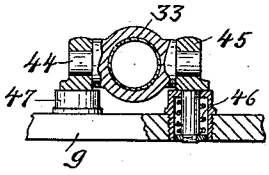

Fig: 4.

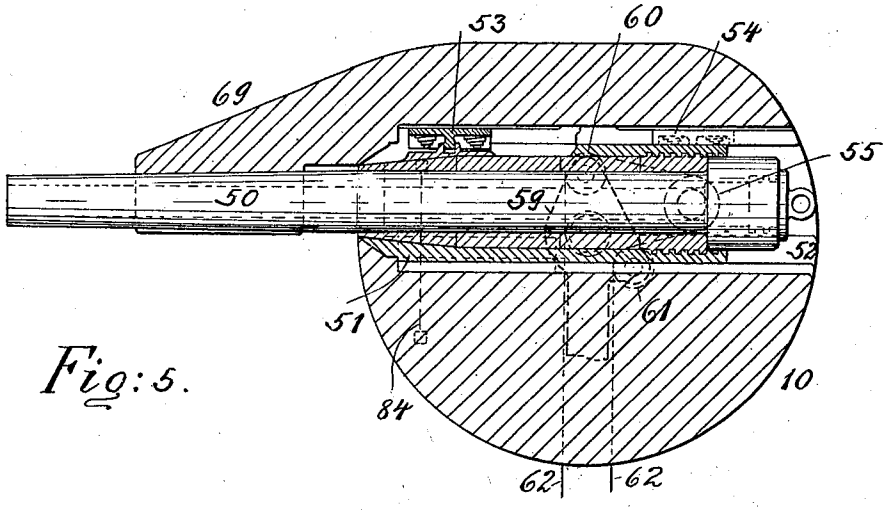

Fig: 5.

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UNITED STATES PATENT OFFICE.

RENÉ GEELHAAR, OF WINTERTHUR, SWITZERLAND.

ARMORED GUN-TOWER.

SPECIFICATION forming part of Letters Patent No. 701,870, dated June 10, 1902.

Application filed May 22, 1901. Serial No. 61,480. (No model.)

To all whom it may concern:

Be it known that I, RENÉ GEELHAAR, a citizen of Switzerland, residing in Winterthur, canton of Zurich, Switzerland, have invented a certain new and useful Improvement in Towers, of which the following is a description.

My invention relates to armored gun-towers in which the gun-casing is adapted for rotation vertically as well as horizontally; and the object of my invention is to provide an armored tower which can be located on mountain slopes and peaks or in valleys or any place where firing at great angles below or above the horizon may be desirable for the protection of certain points, at the same time offering a small target to the enemy. I attain this object by the armored gun-tower described herein and shown in the accompanying drawings, in which—

Figure 1 is a general sectional view in which parts are shown in different sections to make them better understood. Fig. 2 is a partial sectional view at right angles to that of Fig. 1 and on a larger scale. Fig. 3 is a sectional view of one of the spring-mountings for the gears; Fig. 4, a section of the same on the line *a b* of Fig. 3, and Fig. 5 a sectional view of the gun-casing alone with the gun.

Like numbers refer to like parts throughout the several views.

In the accompanying drawings, 1 represents a base or bed of concrete or granite upon which is supported the hollow standard 2. Upon this standard is mounted a hollow circular upright composed of the parts 3 and 4, held together by screws. This upright is adjustable vertically by the screws 5, having anti-friction-bearings. The carriage 6 has at its base a structure of profile iron 7, onto which the operating-platform 8 is attached, and at its upper part a casting 9, containing that part of the driving mechanism by which the vertical movement of the gun-casing 10 is caused. The carriage is supported on this standard at 11 by an antifriction-bearing and on the rails 12 with rollers 13. The rollers 14 prevent the carriage from tipping or being lifted through the effects of a shot or the recoil. One or more hatchways 15, which coincide with an opening in the floor 8, are connected with underground passages or tunnels from whence men, ammunition, and guns to be interchanged may find their way to the interior of the tower. To afford protection to the carriage, I provide for a cover or fixed tower 16, of massive metal, so constructed as to present an oblique surface to impinging shots. The base 17 of this tower is substantially supported on the bed 1 and laps over it far enough to protect the bed in the same level with the carriage. Upon this base 17 the upper part 18 is so mounted on ribs 19 as to leave openings or sighting-slots 20, through which observations may be made. The relative position and form of the base and upper part of this armor-tower is such that it is clear that only a direct shot would enter the slot and all glance shots would strike other parts, as shown in the arrow-lines on both sides of the drawings, and prevent particles of shot from entering. (See Fig. 1.) This relative position also affords observation in a great angle, as shown by the dotted lines 21 and 22. A mirror 23 is used where the eye cannot be placed near enough. The rotating motion is given the carriage by the hand-wheel 24, and the worm 25, which is fixed in bearings on the base of the carriage and which operate on the fixed worm-wheel 26.

The gun-casing 10 rests on the rollers 27 and 28, which latter are mounted on the carriage 9. The driving mechanism for the gun-casing in the vertical plane consists in two sets of clamping-rollers 29 and 30, which at the same time help to hold the gun-casing downward against the rollers 27 and 28. One set of these rollers serve as pressure and guide rollers, whereas the other are actual driving rollers or gears. The shocks to which the gun-casing is subject requires a very elastic but powerful construction of all mechanism connected therewith, and I therefore construct the driving mechanism or rollers 27 and 28 as shown in Figs. 1 and 2 in view and in Figs. 3 and 4 in section. The friction roller or gear 30 is permanently fixed to the shaft 32, which is carried in the bearing 33 and in the hollow tube 34 of the bevel-gear 35. The shaft 32 has a number of keyways 31, which engage in feathers. The lower end of shaft has a collar 38, which forms a pressure-surface for the spring 39. A bearing 40, with studs 41 and 42, which latter are again car-

ried in bearings 43, forms the support for the bevel-gearing 35. A worm-wheel 36, which is part of the small bevel, engages a worm 37. The studs 44 of the bearing 33 are supported in bearings 45, which are also made elastic by the springs 46, mounted in the casing 47. It will be understood that when through any cause the gun-casing lifts slightly the springs 39 will cause it to return in place, whereas these springs, in connection with the springs 41, counteract a dislocation of the gun-casing, the shafts 32 being pivoted on the studs 41. The worm 37 is mounted on the shaft 48 and supported in the bearings 38, which are part of bearings 43, all these bearings being attached to the top of carriage 9, as shown best in Figs. 1 and 2. A hand-wheel 49 is mounted on the shaft 48 and serves for the operation of the one set of friction rollers or gears, whereas the other set merely serve as holddowns.

The gun 50 is so mounted in the gun-casing 10 that it may slide therein. The gun is screwed or otherwise attached in a sleeve 51, which is fitted to slides in an opening 52 of the gun-casing 10. This sleeve is only guided at the bottom and sides, and two sets of springs 53 and 54 hold it down. Near the rear end of the casing are rollers 55. Trunnions 56 in the slots 57 of the gun-casing, which are located in the turning-point, serve as supports or bearings for the sighting mechanism 58 and for the arm 59, containing the rollers 60 and 61. Over each of these sets of rollers 60, 55, and 61 a steel band 62 passes and extends downward alongside of the sighting-tubes 63 to a cross-head 64. A piston-rod 65, connected to this cross-head, extends downward and has on its lower end a piston 66, running in a cylinder 67, filled with oil or any other fluid. This cylinder is supported in antifriction-bearings in the hollow upright of the standard 2. A weight 68 is attached by means of a chain to said piston-rod. The action of recoil is as follows: The gun slides back in the guides and draws the steel band 62 with it, thereby raising the piston 66, which, by the way, has an opening, so as to allow the oil to pass to the other side, at the same time lifting the weight. After the momentum has been destroyed the weight will bring the gun in its orignal position. It can plainly be seen that with this kind of a recoil-check the gun-casing is a little shocked by firing. I provide the gun-casing with a projection 69 to protect the barrel of the gun as much as possible against impinging shots. The top of the carriage 9 contains a circular opening 70, through which the gun may be loaded or exchanged, the position being that shown in the dotted line 71.

The sighting mechanisms 58, of which there are two, which are mounted in the gun-casing 10, have the purpose of aiming the gun directly instead of solely with scales 72, that show the angle of inclination, and scale 73 by which the direction horizontally may be set. It consists of an upright tube 63, with an opening 74 on its lower end, through which the operator may see the aim with the aid of the mirrors 75 76 77 78. The mirror 78 is held in the tube 79, which, having mounted on it the gear 80, may be turned by gear 81, which latter is operated from the interior of the tower by a hand-wheel, (not seen,) a rod 82, extending upward, and the bevel-gears 83. The wire string 84 being mounted toward the mouth of the gun completes the parts belonging to the sighting or aiming device. Aiming is done as follows: The carriage and gun-casing are revolved by the hand-wheel 24 until the target or point to be fired upon appears on the mirror 75, at the same time coinciding with the line of the wire string, that also appears on the mirror. The inclination is calculated or read from the map, and with the aid of the scale 72 the gun is given the correct position independently of the position of sighting-mechanism. By using a hair cross in place of a single wire a direct aim may also be taken. I provide for two sighting mechanisms, one on either side of gun-casing, the reason being that should one be struck by a shot the other is available, and in case of both being put out of operation the gun may be used as a blind gun, the aim being made with the aid of maps and scales on the carriage and gun-casing and the observing-slots. The exposed parts are easily interchangeable, and by turning the carriage and gun-casing so the side to be repaired is protected against the enemy these parts may be replaced from the outside in a very short time.

By making a few changes in the construction of my tower it may also be applicable to mortars and howitzers.

I do not wish to confine myself to the outer shape of my tower or the gun-casing, it being so formed to suit the circumstance. On a mountain slope, for instance, the whole construction would probably be exposed on but one side and not extend from the slope, so that as little as possible would be exposed. Furthermore, I do not wish to confine myself to the construction of parts mentioned in my specification.

The importance of the armored tower I describe herein is very great, since to my knowledge no gun mounted in a protected tower can be inclined at so steep nor high an angle and since the relative size of the exposed surface is so small at the same time offering great resistance that a destruction of the tower or its parts is practically impossible.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is as follows:

1. In an armored gun-tower the combination of a standard, with a rotatable carriage mounted thereon, a shield, a gun-casing exterior of said shield and means for rotating said carriage horizontally and gun-casing vertically above and below the horizontal plane, substantially as described.

2. In an armored gun-tower the combination of a standard, with rotatable carriage mounted thereon, a gun-casing containing a gun running in a slide in said casing, a recoil mechanism, a mechanism for rotating said carriage horizontally and gun-casing vertically above and below the horizontal plane, and a shield protecting said mechanism, said gun being mounted exterior of said shield, substantially as described.

3. In an armored gun-tower the combination of a standard, a carriage mounted thereon, a gun-casing containing a gun running in a slide in said casing, a fluid recoil mechanism, means for rotating said carriage horizontally and gun vertically above and below the horizontal plane, a shield protecting said mechanism and a sighting or aiming mechanism operated from within said shield, substantially as described.

4. In an armored tower the combination of a standard, a carriage mounted thereon, a gun-casing containing a gun, a recoil mechanism a shield, said shield containing observing-slots, a sighting mechanism, means for rotating said carriage and means for rotating and fastening said gun-casing which latter is composed of two sets of gears in a spring-mounting in combination with bevel-gearing, worm-wheel and hand-wheel, substantially as described.

5. In an armored tower the combination of a standard, a carriage mounted thereon, a gun-casing containing a gun, a recoil mechanism, a shield and means for rotating said gun-casing vertically, said recoil mechanism consisting of rollers over which a band passes, the latter being connected to a piston contained in a cylinder of fluid, substantially as described.

6. In an armored tower the combination of a standard, a carriage carrying an operating-platform, a gun-casing, a shield, and means for rotating said gun-casing vertically above and below the horizontal plane, substantially as described.

7. In an armored tower the combination of a cone-like shield with a gun mounted at the apex thereof and mechanism for swinging the same vertically above and below the horizontal plane, substantially as described.

RENÉ GEELHAAR.

Witnesses:
J. BASLER,
W. GYR.