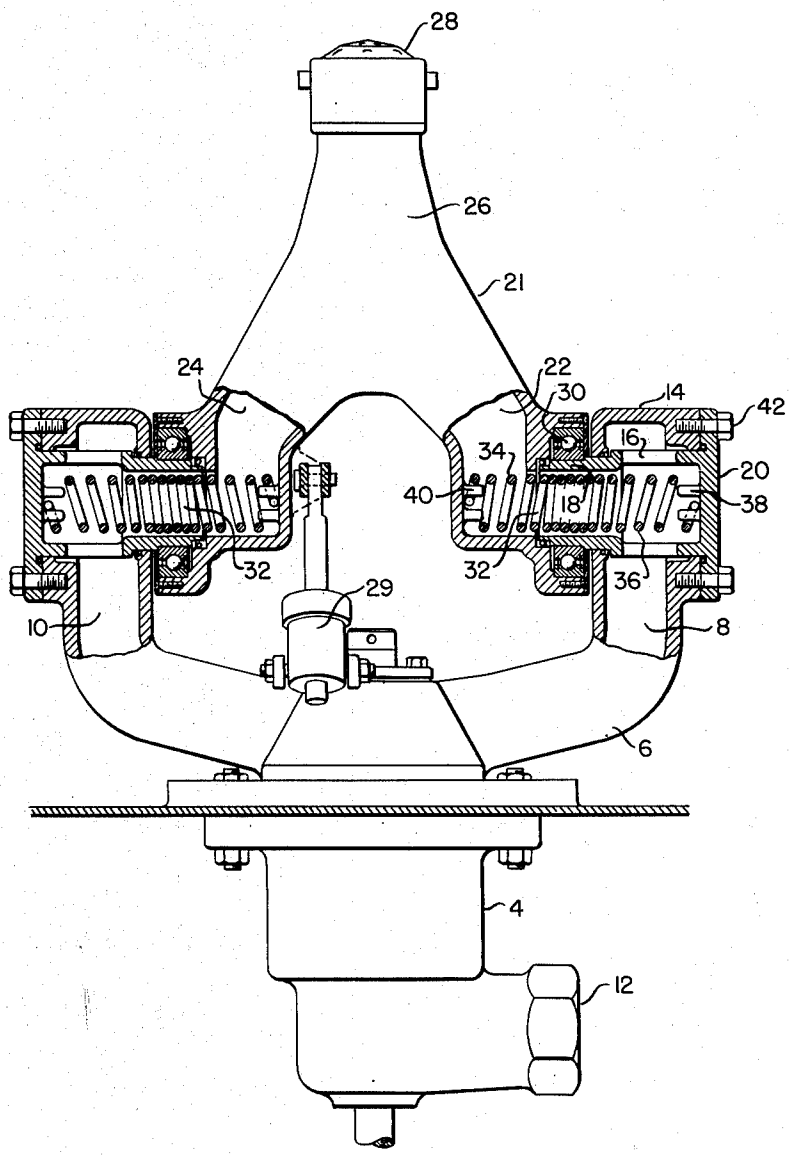
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COUNTERBALANCE FOR FIRE FIGHTING TURRETS

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COUNTERBALANCE FOR FIRE FIGHTING TURRETS

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1

The present invention relates to counterbalances for fire fighting turrets.

Turrets for fire fighting, whether stationary or portable, are designed for operating both in azimuth and elevation. For the elevation control it is desirable to provide a counterbalance. In a stationary installation a counterweight may sometimes be used, but in portable installations the counterweight adds excessive weight to the equipment. This is particularly true when high elevations are required, since in that case the weight must be placed close to the axis of rotation and its size must be correspondingly increased. A large weight also increases the moment of inertia which requires considerable power for training the nozzle. Spring counterbalances are difficult to apply because of the peculiar construction of the turret mechanism. It is undesirable to have the counterbalance mechanism exposed, but on the other hand the use of a counterbalance in the water passages poses a difficult problem of manufacture.

The object of the present invention is to provide a spring-type counterbalance for fire fighting turrets which may be conveniently capable of ready adjustment, and which does not materially impede the flow of liquid through the turret.

With the above and other objects in view, as will hereinafter appear, the principal feature of the invention comprises an internal torsion spring disposed on the elevation axis of the nozzle body and therefore directly in the water passage. Preferably two symmetrically disposed springs are used. The springs are wound with convolutions of varying pitch, whereby the pitch at the end is sufficient to afford a free flow of water while the pitch in the central sections is preferably closer.

Other features of the invention comprise certain features of construction which are hereinafter described and particularly defined in the claims.

The accompanying drawing is a sectional elevation of the preferred form of turret.

The illustrated embodiment of the invention comprises a support indicated at 4 adapted to be suitably mounted as, for example, on the roof of a crash truck. A turret body 6 is mounted for rotation in the frame 4 about a vertical axis whereby the turret may be trained in azimuth. The body 6 has flaring arms 8 and 10 forming passageways serving as water supply passages to the nozzle. The frame 4 is provided with a stationary coupling member 12 by which water or other fire fighting fluid is conducted to the arms 8 and 10.

2

As is customary in turret construction, the arms 8 and 10 support the bearing members for the nozzle. For example, the arm 8 terminates in a drum-like casing 14 having received therein a cage-like member 16 which has connected to its inner end a journal 18 and at its outer end a flange 20. The flange 20 is bolted to the casing. An exactly similar construction is provided for the arm 10.

The nozzle member 21 is mounted on the journals 18. It comprises an elongated member having water passages 22 and 24 communicating with a central passage 26 and terminating in a suitable nozzle or spray device 28. The part 28 is herein shown as a fog nozzle of the type shown in the Freeman and Hencinski Patent No. 2,492,037 granted December 20, 1949, although any type of nozzle may be used. A shaper device for forming patterns of foam may also be applied as described in my application Serial No. 255,217, filed November 7, 1951, but forms no part of the present invention and is not here shown.

The elevation axis of the nozzle member is horizontal. The nozzle member is shown as elevated to a vertical position, and is movable to any desired elevation by suitable driving means, shown as a hydraulic cylinder 29.

The nozzle member 21 is provided with ball bearings 30 which rotate on the journals 18. It will be observed that horizontal water passages 32 are provided along the axis of elevation and connect the body passages 8 and 10 with the nozzle body passages 22 and 24. Suitable seals, which need not be described, are provided to prevent leakage of water.

Mounted in each water passage 32 is a torsion spring 34. Each spring is wound as shown, preferably with closely spaced convolutions in that portion of each spring which is enclosed by the journal 18 and with more widely spaced convolutions 36 at the ends, which lie within the cage 16 and in the passages 22 and 24. One end of each spring is held by a fork 38 on the flange 20 and the other end is held by a fork 40 on the inner portion of the nozzle body.

The flanges 20 are secured by bolts 42 to the drum casing 14. These flanges therefore afford a means of adjusting the spring torsion in increments of the angular spacing of the bolt holes.

Preferably the springs are adjusted in torsion so that the weight of the nozzle is counterbalanced when the nozzle body is in the horizontal position. As the nozzle is elevated toward the vertical the moment arm due to the weight of the nozzle diminishes. The springs are arranged to

unwind so that their torsional effect becomes less as the nozzle rises. This requires that the springs be wound in opposite senses, one being a "right hand" and the other a "left hand" spring. It is possible to adjust the spring torsion so that the weight of the nozzle will be substantially exactly counterbalanced throughout its entire range of movement. However, an exact balance at all positions is not necessary because there will be sufficient friction in the parts to compensate for any slight unbalance.

It will be observed that if the nozzle is depressed below the horizontal, the spring torsion will increase while the moment arm is reduced. This introduces a slight unbalance, but since the nozzle is not ordinarily called upon to be depressed to any considerable extent below the horizontal, the unbalance is small and is readily taken up by the friction of the parts. It will be understood that manual or automatic mechanism is used for operating the turret and the mechanism itself will be used to determine the position of the nozzle, the main purpose of the counterbalance being to remove the major sources of unbalance whereby the operating mechanism is not required to be large enough to move or to support a greatly unbalanced system.

The present construction is especially suitable for turret arrangements in which a considerable flow of liquid takes place. It will be observed that there is a substantial spacing between the convolutions of the springs at 36, namely, at the ends where the water flows into and out of the axial passages 32. It has been found that even under high flow conditions the resistance to flow is negligible. The convolutions are shown as being in contact with one another in the central portion of each spring. It is not necessary that there be an actual contact, but a close spacing is preferred since it provides relatively smooth passages for the flow of water in the axial direction.

Having thus described my invention, I claim:

1. A fire fighting turret comprising a turret body rotatable about a vertical axis and having at least one flaring arm with a liquid passageway, a bearing member supported by said arm, a nozzle member mounted on the bearing member and rotatable about a horizontal axis, the nozzle member having a liquid passageway and the bearing member having a connecting passageway along the horizontal axis of rotation, and a torsion spring received in the passageway of the bearing member and fixed at one end to the turret body and at the other end to the nozzle member, said spring being arranged to reach a position of equilibrium as the nozzle member is elevated.

2. A fire fighting turret comprising a turret body rotatable about a vertical axis and having at least one flaring arm with a liquid passageway, a bearing member supported by said arm, a nozzle member mounted on the bearing member and rotatable about a horizontal axis, the nozzle member having a liquid passageway and the bearing member having a connecting passageway along the horizontal axis of rotation, and a torsion spring received in the passageway of the bearing member and fixed at one end to the turret body and at the other end to the nozzle member, said spring being arranged to reach a position of equilibrium as the nozzle member is elevated, the spring having widely spaced convolutions at its ends to permit flow of water from the body passageway into the nozzle passageway.

3. A fire fighting turret comprising a turret body rotatable about a vertical axis and having two flaring arms with liquid passageways, bearing members supported by said arms, a nozzle member journaled on the bearing members and rotatable about a horizontal axis, the nozzle member having a liquid passageway and the bearing members having passageways along the horizontal axis to connect the passageways of the arms with the nozzle passageway, and torsion springs received within the bearing members each fixed at one end to the turret body and at the other end to the nozzle member, said springs being arranged to reach a position of equilibrium as the nozzle member is elevated.

4. A fire fighting turret comprising a turret body rotatable about a vertical axis and having two flaring arms with liquid passageways, bearing members supported by said arms, a cage member reecived in each bearing member and having a journal at its inner end, adjustable means for securing each cage member to its bearing member, a nozzle member mounted on the journals to be rotated about a horizontal axis, the nozzle member having a liquid pasageway and the bearing members having passageways along the horizontal axis to connect the passageways of the arms with the nozzle passageway, and torsion springs received within the bearing members and each fixed at one end to a cage member and at the other end to the nozzle member, said springs being arranged to reach a position of equilibrium as the nozzle member is elevated.

5. A fire fighting turret comprising a turret body rotatable about a vertical axis and having at least one flaring arm with a liquid passageway, a bearing member supported by said arm, a nozzle member mounted on the bearing member and rotatable about a horizontal axis, the nozzle member having a center of gravity displaced from said horizontal axis and a liquid passageway, and the bearing member having a connecting passageway along said horizontal axis, and a torsion spring received in the passageway of the bearing member and fixed at one end to the turret body and at the other end to the nozzle member, said spring being arranged to offset the torque due to gravity upon the nozzle member at a predetermined position and to approach its equilibrium position as the nozzle elevation is increased from said position and the torque due to gravity is correspondingly decreased, whereby over an appreciable range of elevations the torque of the spring is substantially equal to the torque due to gravity.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
336,129	McGahan	Feb. 16, 1886
551,575	Bookwalter	Dec. 17, 1895
1,899,735	Woodruff	Feb. 28, 1933
2,507,663	Hamilton	May 16, 1950