

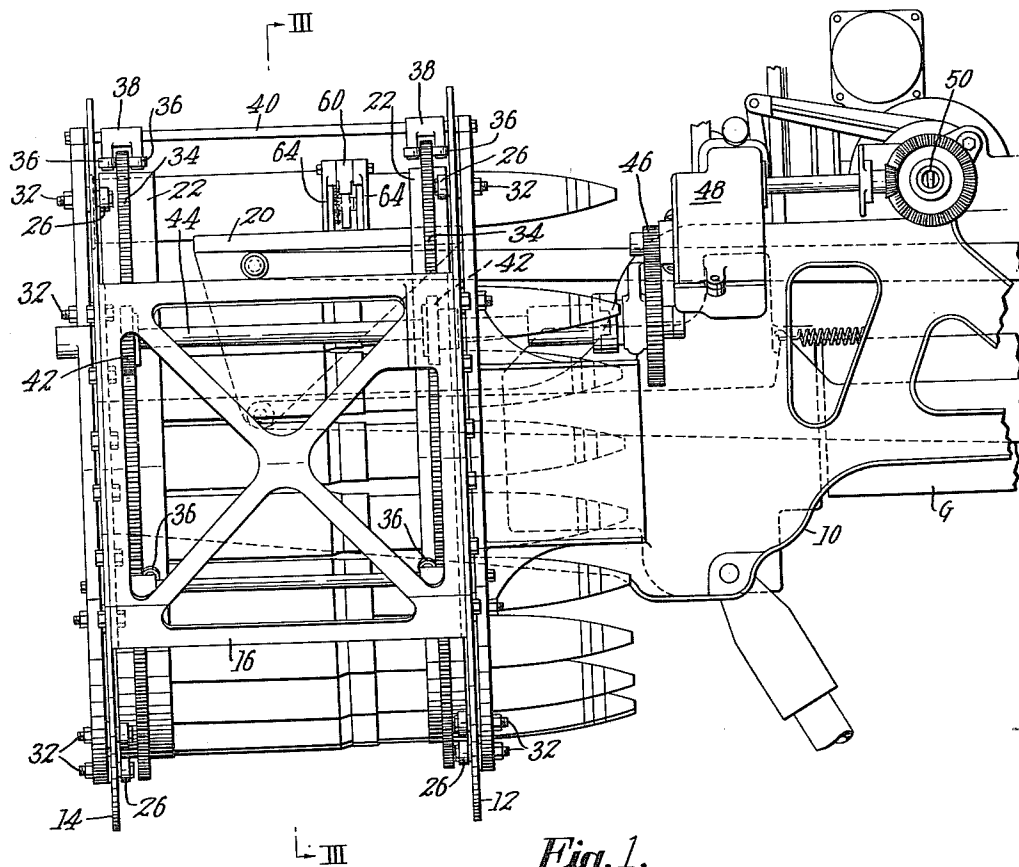
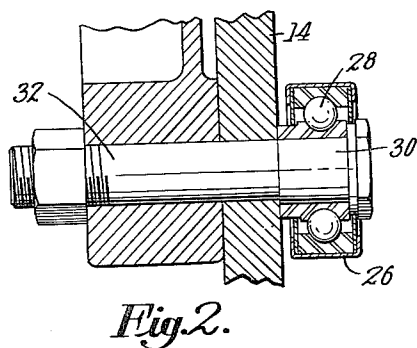
Aug. 17, 1948.

E. J. RAY
GUN AMMUNITION MAGAZINE

2,447,092

Filed June 29, 1944

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

Fig. 4.

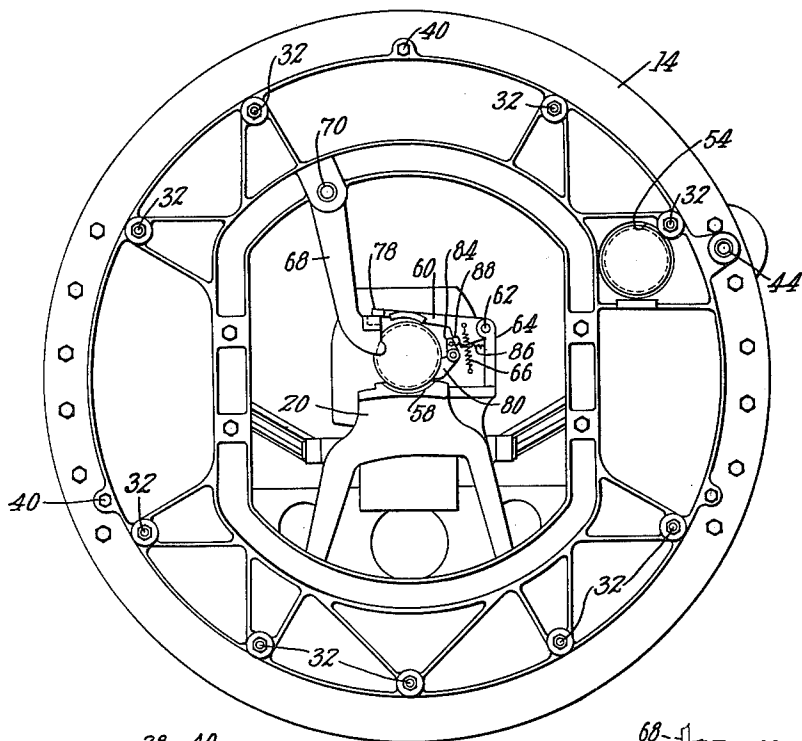


Fig. 5.

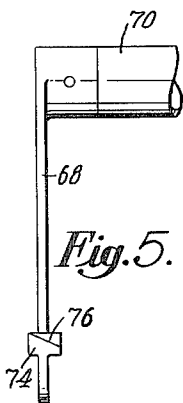
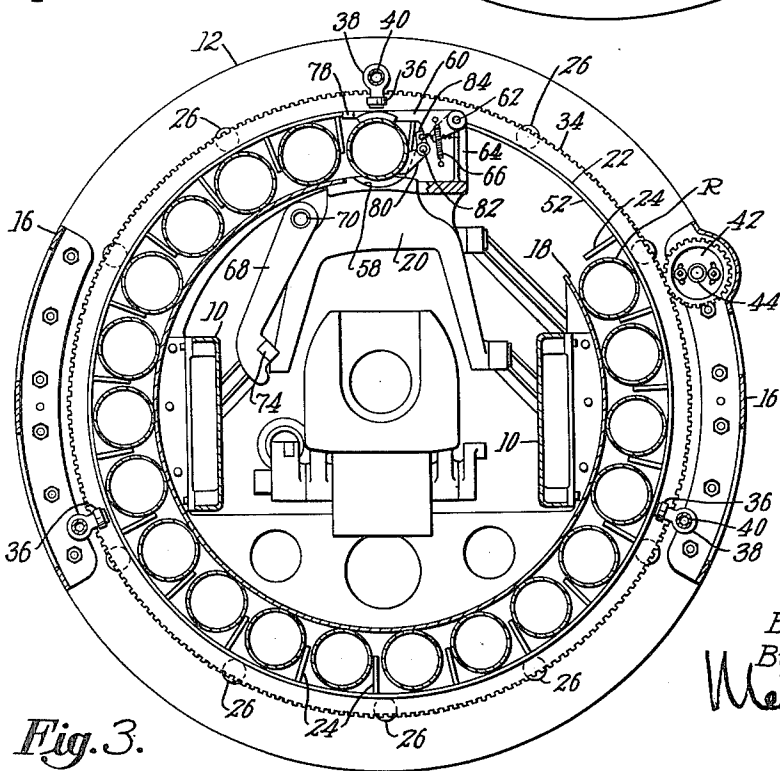
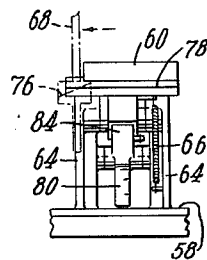


Fig. 6.

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UNITED STATES PATENT OFFICE

2,447,092

GUN AMMUNITION MAGAZINE

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Application June 29, 1944, Serial No. 542,707

1 Claim. (Cl. 89—34)

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This invention relates to guns and more particularly to magazines for supporting rounds to be loaded automatically into guns of large caliber. The invention is illustrated herein as applied to a gun equipped with an automatic fuse-setting and loading mechanism of the type shown in the application for Letters Patent of the United States, Serial No. 521,668, filed February 9, 1944 in the name of Sidney J. Finn. The gun of the Finn application is designed particularly for use in airplanes and in view of the limited space in the noses of certain airplanes in which the gun may be mounted, the magazine is kidney shaped thereby permitting the use of the maximum number of rounds in the limited space available while permitting freedom of movement of the gun in elevation and in azimuth.

An object of the present invention is to provide an improved rounds magazine of simplified construction suitable for use with guns of large caliber adapted for use when the available space is not at such a premium as to require the use of a magazine of the type shown by the Finn application. To this end and in accordance with a feature of the invention, the rounds magazine is of circular construction mounted concentrically with the longitudinal axis of the gun for movement therewith in elevation and in azimuth. The magazine comprises a pair of concentric circular cages providing between them an annular space within which the rounds are contained. The outer cage is provided with rounds-engaging members and provision is made for indexing the outer cage to carry the rounds one at a time into a position from which they are removed and transported into ramming position rearwardly of the gun.

In accordance with a further feature of the invention the means for transporting the rounds into ramming position carries a rounds-gripping member for holding the rounds firmly as they are being thus carried. This member is automatically retracted by the rammer at the first part of the ramming movement thereof to permit the rounds to be moved forwardly into the breech end of the gun, and the gripping member is held in retracted position by a latch. As the transfer tray moves back into rounds-receiving position, the outer cage of the magazine is indexed to move another round into position on the tray at which time the round engages the latch to release it and permit the gripping member to move under the force of a spring into gripping engagement with the round.

The above and other features of the invention,

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including various novel details of construction and combinations of parts will now be described in detail by reference to the accompanying drawings and pointed out in the claim.

5 In the drawings,

Fig. 1 is a side elevation of one form of magazine in which the invention is embodied, the magazine being illustrated as mounted at the breech end of a gun;

10 Fig. 2 is a section through one of the supporting rolls for the outer cage of the magazine;

Fig. 3 is a view, partly in section on the line III—III of Fig. 1, with the tray and rammer shown in full lines;

15 Fig. 4 is a rear elevation of the magazine;

Fig. 5 is a side elevation of the rammer arm; and

20 Fig. 6 is a side elevation of the rounds-gripping member and the associated latch carried by the transfer tray.

The magazine is shown in Fig. 1 as being carried by the rearward ends of a pair of arms 10 mounted at opposite sides of a gun G and extending rearwardly thereof. These arms are mounted for movements in elevation and azimuth with the gun as disclosed in the Finn application referred to above. Carried by the arms are front and rear circular walls 12 and 14 of the magazine connected together by side frame members 16. Carried by the arms 10 between the walls 12 and 14 is a cylindrical inner cage 18 having an opening in its upper portion to permit a transfer tray 20 to move upwardly into rounds-receiving position as shown in Fig. 3.

35 A plurality of rounds R are supported between the inner cage 18 and an outer cage formed of a pair of spaced rings 22 engageable with the forward and rearward portions of the rounds. The rings 22 are provided with fingers 24 extending radially inward toward the cage 18 so that as the rings are turned with respect to the cage 18 in a clockwise direction as viewed in Fig. 3 the rounds will be moved to a release station to be received by the transfer tray and lowered into ramming position in alignment with the gun.

40 The rings 22 are rotatably carried by the front and rear walls of the magazine on rolls 26 carried by anti-friction bearings 28 (Fig. 2), mounted on eccentric portions 30 of studs 32 passing through and secured to the front and rear walls. The mounting of the rolls on the eccentric portions 30 of the studs permits adjustment of the rolls to facilitate the accurate positioning of the rings with respect to the cage 18 so that the

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rings and the cage are concentrically disposed with respect to each other. The rings 22 carry external gears 34 which are engaged at opposite sides by rolls 36 on brackets 38 extending inwardly from rods 40 connected to the front and rear walls of the magazine. These rolls coast with the gears 34 to hold the rings 22 in properly spaced relation against axial movement. For driving the rings, pinions 42 engage the teeth 34 of the rings, these pinions being mounted on a shaft 44 carried by the front and rear walls of the magazine and extending forwardly thereof. The shaft 44 is connected through suitable gearing 46, 48 to a cam shaft 50 which may be driven as shown in the Finn application thereby to index the rounds one at a time to the release station. The pinions 42 are adjustably connected to the shaft 44 as indicated in Fig. 3 so that the fingers 24 on the front and rear rings 22 of the outer cage may be properly aligned with each other.

The rounds are loaded through an aperture 54 in the rear wall 14 of the magazine. Endwise movement of the rounds within the magazine is prevented by engagement of the opposite sides of the rim at the end of the shell case by the inner portion 52 (Fig. 3) of the rear ring 22 and by the rear wall 14.

The transfer tray 20 by which the rounds are removed from the magazine and lowered into ramming position, includes a rounds-supporting surface 58 against which the round is held during descent of the tray by a rounds-holding arm 60 pivoted at 62 between a pair of upwardly extending brackets 64 carried at the central portion of the tray. This arm is urged downwardly by a spring 66 thereby to hold the round until the beginning of the ramming movement thereof. After the tray has carried the round into the position shown in Fig. 4 a rammer 68 carried by a shaft 70 moves first in a counterclockwise direction from the position shown in Fig. 3 to the position shown in Fig. 4 and then forwardly to engage the back end of the round and to move it forwardly of the tray into the breech end of the gun. As shown in Fig. 5 the rammer is provided above its lowermost rounds-engaging portion with a projection 74 having an inclined surface 76. As the rammer moves forwardly or toward the left, as viewed in Fig. 6, the inclined surface 76 engages a projection 78 of the rounds-holding arm 60 thus lifting it away from the round against the force of the spring 66 into the position shown in Fig. 4 so that the round is free to be moved forwardly along the transfer tray.

It will be noted that the rearward edge of the surface 58 of the transfer tray is beveled, permitting the flange of the round readily to ride thereon in the ramming operation, the arm 60 yielding slightly to permit this. The arm is lifted clear of the round by the projection 74 of the rammer just before the flange reaches the position in which it would engage it.

In order to maintain the arm 60 in its raised position until another round has been introduced thereinto, a latch 80 is provided for holding the arm 60 in the position to which it has been moved by the rammer. The latch 80 is pivoted on a pin 82 between the brackets 64 and has an upwardly extending portion 84 urged by a spring 86 into position behind a shoulder 88 formed on the arm 60. This latch 80 engages a portion of the round

until the round has been moved forwardly thereof by the rammer. However, as soon as the round has passed beyond the latch 80 the spring 86 moves the latch into locking engagement with the arm 60 which is still held by the rammer in its elevated position. Immediately after this happens the rammer, moving in the direction of the arrow (Fig. 6), moves out of engagement with the arm 60 but the arm is prevented from moving downwardly by its engagement with the latch 80.

The mechanism for indexing the rounds in the magazine is so timed with respect to the movement of the transfer tray that a new round is moved onto the tray at the time that the tray returns to its uppermost position as shown in Fig. 3. As the round moves onto the tray it engages the latch 80 moving it against the force of the spring 86 out of locking engagement with the arm 60 so that the arm is now free to be moved by the spring 66 into engagement with the round thereby to hold it firmly in position on the transfer tray. It will be understood that the transfer tray and the rammer may be operated by mechanisms similar to that shown in the Finn application and inasmuch as these form no part of the present invention they are not disclosed in detail.

From the above it will be seen that I have provided a circular rounds magazine of simple construction adapted for use with mounts where sufficient space is available for the employment of such a magazine. In addition, a simplified rounds-holding arrangement is carried by the transfer tray, released by the rammer and returned into locking position upon the introduction of a new round on the transfer tray.

Having thus described the invention, what I claim as new and desire to secure by Letters Patent of the United States is:

An annular rounds magazine comprising an inner circular cage having an opening in its upper portion for movement of rounds inwardly thereof, an outer cage concentric with said inner cage and comprising a pair of spaced rings, anti-friction bearings supporting said rings in spaced relation to each other and in concentric relation to said inner cage, inwardly extending rounds-engaging members carried by said rings, an external ring gear on the periphery of each of said rings, a drive shaft, means supporting said drive shaft adjacent to the peripheries of said rings with its axis parallel to the axis of said rings, and pinions secured to said drive shaft in driving engagement with the gears carried by said rings.

EUGENE J. RAY.

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