March 22, 1949. W. J. TURNBULL 2,464,905

AMMUNITION CONVEYING SYSTEM

Filed April 30, 1943 2 Sheets-Sheet 1

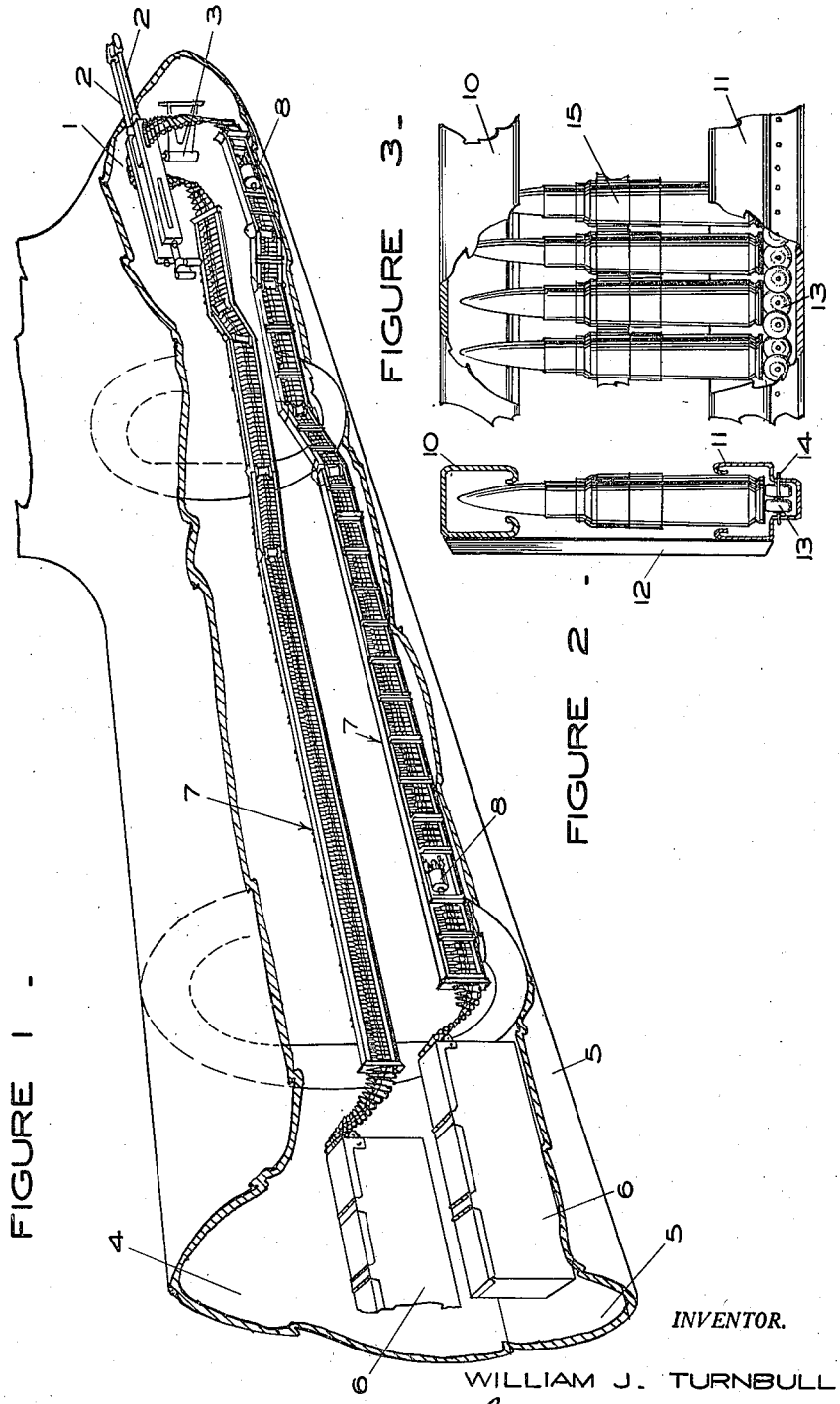


FIGURE 1 -

FIGURE 2 -

FIGURE 3 -

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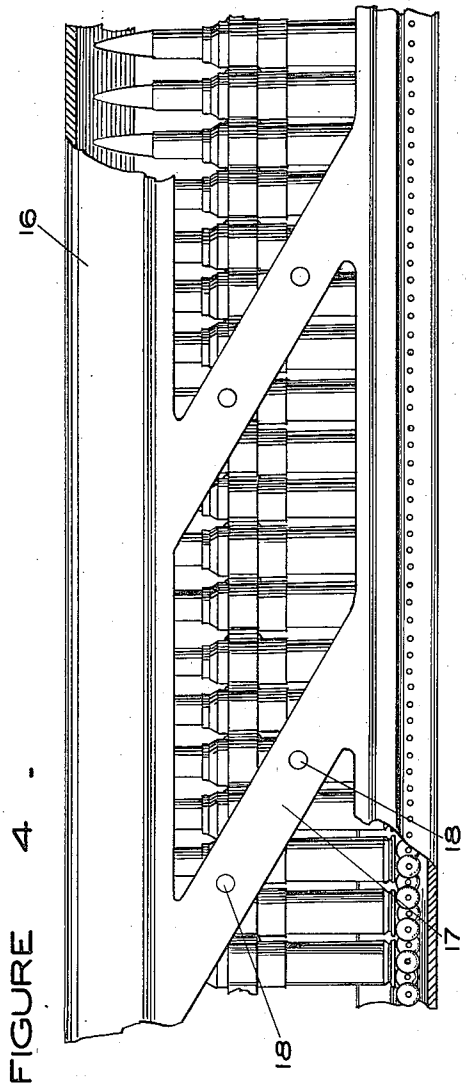


FIGURE 4 -

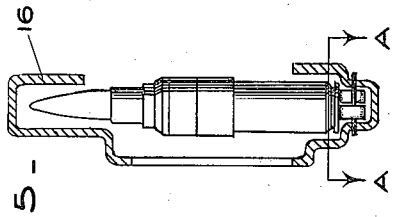


FIGURE 5 -

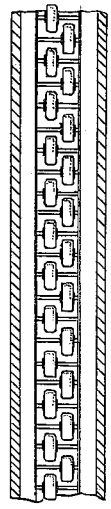


FIGURE 6 -

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Patented Mar. 22, 1949

2,464,905

UNITED STATES PATENT OFFICE

2,464,905

AMMUNITION CONVEYING SYSTEM

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Application April 30, 1943, Serial No. 485,123

3 Claims. (Cl. 89—33)

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This invention relates to an ammunition conveying and storing system, to furnish ammunition to guns remotely placed from the supply of ammunition.

The tail guns of a bomber serve a very important function in protecting the bomber. To fight off persistent attack upon the bomber, a large quantity of ammunition is required. Due to the critical location of the tail gun turret, from weight considerations, the large quantity of ammunition necessary for this turret cannot be locally stored for reasons of lack of space, too great a concentration of load too far from the center of gravity, to great stress on the fuselage due to such a load, etc.

It is necessary, therefore, to distribute the load or to store the large quantity of ammunition needed at a point as near the center of gravity of the ship as possible.

In nose turrets or wing gun turrets, the problem is similar and the solution is substantially the same.

By this invention, a large quantity of ammunition can be stored nearer the center of gravity and be readily supplied to a remote gun.

The invention feeds the ammunition only as required and prevents the shifting of the ammunition in the conveyor due to acceleration and deceleration of the airplane.

The ammunition tracks may be secured to the sides of the fuselage or other aircraft structure, and can readily be arranged so as not to impede passage along the fuselage to the turret or interfere with other installations.

The ammunition conveyor disclosed, precludes the necessity of having a member of the bomber crew bring up additional magazines or have the turret space crowded with extra ammunition boxes.

Further and other objects will become apparent from the description of the accompanying drawings which form a part of this disclosure and in which like numerals refer to like parts.

In the drawings:

Figure 1 is a fragmentary view of a fuselage showing the ammunition feeding system.

Figure 2 is a sectional view through the ammunition track.

Figure 3 is a fragmentary view of the ammunition track.

Figures 4 and 5 illustrate a modified form of the ammunition track.

Figure 6 is a section taken on the line *a—a* of Figure 5.

Figure 1 of the drawing illustrates by way of

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example on installation of the ammunition conveying system of a bomber. The tail gun turret 1 is located at the rear of the fuselage under rudder assembly. It is usual to have a pair of .50 caliber guns 2, on mount 3. Large ammunition storage boxes 6 are lifted into place in the rear bomb bay 4, through bomb bay doors 5 and may be secured to the bomb racks or stowed in any available space. The ammunition is stored in link belts in the boxes 6 and is moved along in the tracks, generally indicated as 7, secured to the aircraft structure and extend from the boxes to points adjacent the guns. The tracks may be in sections to afford flexibility and facilitate installation.

In some installations where the tracks extend from the turret along a substantial portion of the fuselage or wing structure, the tracks may have sufficient storage capacity and the ammunition box itself may be eliminated. The weight distribution is accomplished by storing the ammunition in tracks rather than in a box, or boxes and tracks.

The feeding of the ammunition along the track is controlled by ammunition boosters 8. These boosters are actuated in response to the rate of feed of the belt to supply ammunition to the guns.

The boosters have sprockets that engage the cartridges which are driven by a motor through a worm and gear. The non-reversing feature of the worm and gear causes the sprockets to retain the ammunition in place when there is a tendency for the ammunition to shift forwardly or back in the track with the motion of the airplane.

The track structure is illustrated in Figures 2 and 3, and comprises channels 10 and 11 spaced by supports 12. The upper channel member merely acts as a retainer. The bullet end of the cartridge is guided and supported by channel member 11. The lower channel member has rollers 13 arranged in two rows. Each roller is on a shaft 14 that extends through the lower portion of member 11. These shafts are spaced a little more than the diameter of a roller apart so that the rollers overlap in the rows to afford support for the ends of the cartridges at all times. The belt 15 helps to maintain the assembly of cartridges in an upright position. Supporting the ends of each cartridge by at least two rollers causes the belt of cartridges to move along smoothly over the rollers. The belts of ammunition are moved by the boosters along the track, the tops and bottoms of the cartridges are restrained from lateral motion by the top and bot-

tom guides and the lower ends of the bullets move smoothly in the plane determined by the tops of the rollers. It will be noted that the spacers 12 are all on the same side of the channels 10 and 11 so that when the belt of ammunition is started in the track, one can pull the belt along the open side of the track to facilitate loading. The plan view of the roller arrangement is illustrated in Figure 6.

The modification of the track, illustrated in Figures 4 and 5, shows a unitary track structure 16 as distinguished from that of Figures 2 and 3 where the channel members are separately formed and spaced by members 12. This type of track can readily be made by extruding plastic material, molding or in any other suitable manner. The spacers 17 are formed with a considerable slope to allow ample latitude in installing the track. Holes 18 are drilled as the track is installed and because of the latitude afforded by the sloping members 17, it is a practical certainty that members 17 will coincide in some portion with structure to which the track may be secured. In all other respects this track functions as does the above described track.

Either of the above described tracks may be used to convey ammunition on end that is not restrained by the belt.

By this arrangement large boxes of ammunition may be hoisted into the rear bomb bay of a medium bomber or any location nearer the center of gravity than the turret. The ammunition can be supplied from these storage boxes to remote gun turrets in the tracks by the boosters or merely fed along the track. The load of the ammunition is best carried nearer the center of gravity of the airplane and the change of load in the airplane as the ammunition is used up, has little effect on the trim of the craft.

It is to be understood that certain changes, alterations, modifications and substitutions can be made without departing from the spirit and scope of the appended claims.

I claim as my invention:

1. In an aircraft having a fuselage, a turret having guns mounted therein, positioned adjacent one end of said fuselage, a bomb bay in said fuselage located nearer the center of gravity of the aircraft than said turret, ammunition storage boxes in said bomb bay, ammunition track means to convey cartridges in an upright position on their primer ends from a point adjacent said storage boxes to said turret guns, said track means being secured along the inside wall of said fuselage and comprising top and bottom channel guide means for guiding the ends of the cartridges moving in upright positions, said bottom guide means including a plurality of rollers to support the primer ends of said cartridges, said rollers being so arranged that the plane of the primer end of each cartridge is maintained by more than one roller, means on one side of said guide means to space said top and bottom channels so that the side of the track facing inwardly of the fuselage is unobstructed by supporting members and affords ready access to the belt of cartridges at any point.

2. In an aircraft having a fuselage, a turret having guns mounted therein, located adjacent one end of said fuselage, a bomb bay in said fuselage located nearer the center of gravity of said aircraft than said turret, ammunition storage means in said bomb bay, ammunition track means to convey the ammunition in an upright position from a point adjacent said storage means to said turret guns, said ammunition track comprising spaced top and bottom channel guide means for guiding the ends of cartridges moving in upright positions, a plurality of rollers in the bottom of said guide means to support the primer ends of the cartridges so arranged that the primer end of each cartridge is engaged by more than one roller, and means intermediate the gun turret and ammunition storage means cooperating with said track means to control the movement of ammunition therein in accordance with the rate of firing of the guns.

3. In an aircraft having a fuselage, ammunition storage means located in the vicinity of the center of gravity of said aircraft, a turret having guns mounted therein located at a point spaced remotely from said storage means longitudinally of said fuselage, ammunition track means to convey the ammunition in an upright position from a point adjacent said storage means to said turret guns, said ammunition track comprising spaced top and bottom channel guide means for guiding the ends of cartridges moving in an upright position, a plurality of rollers in the bottom of said guide means to support the primer ends of the cartridges so that the primer end of each cartridge is engaged by more than one roller, and means intermediate the gun turret and ammunition storage means cooperating with said track means to control the movement of ammunition therein in accordance with the rate of firing of the guns.

WILLIAM J. TURNBULL.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
563,701	Wilder	July 7, 1896
799,699	Winter	Sept. 19, 1905
872,856	Spence	Dec. 3, 1907
1,565,836	Webster	Dec. 15, 1925
1,845,508	Minshall	Feb. 16, 1932
1,907,342	Capell	May 2, 1933
2,303,976	Bawcutt et al.	Dec. 1, 1942
2,305,667	Brentnall	Dec. 22, 1942
2,310,884	Trevaskis	Feb. 9, 1943
2,321,142	Horncastle	June 8, 1943
2,329,308	Trotter et al.	Sept. 14, 1943

FOREIGN PATENTS

Number	Country	Date
5,447	Germany	June 3, 1879
366,247	Italy	Dec. 22, 1938
373,677	Italy	Aug. 1, 1939
495,187	Great Britain	Nov. 7, 1938
538,808	Great Britain	Aug. 18, 1941

OTHER REFERENCES

"The Halifax," in British "Flight," April 23, 1942, pp. 400 and 403.

"Power-Operated Gun Turrets, in British "Flight," Feb. 4, 1943, pp. 125–126.