ROTARY AMMUNITION BELT FEEDER HAVING A PLURALITY OF BELT FEED APERTURES

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ABSTRACT OF THE DISCLOSURE

An ammunition belt feeder for an automatic weapon and having a housing with a movable feed sprocket mounted therein for an ammunition belt and an intermittently-operated drive mechanism with a coupling for connecting and disconnecting the feed sprocket and at least two belt feed apertures in the housing and the direction of movement of the feed sprocket is constant.

The invention relates to an ammunition belt feeder with intermittently-driven feed sprocket for feeding cartridge ammunition in belts to automatic weapons. In order to press home an attack, in particular with automatic weapons housed in armoured fighting vehicles, it is desired to be able to fire several different types of ammunition at will, and to be able to effect a change from one type of ammunition to another type in the shortest possible time. Belt feeders for automatic weapons hitherto known, however, do not make possible a rapid change of ammunition of the transition from a belt of one type of ammunition to another type, since, generally, they have only a single feed aperture for the introduction of a belt, and it is possible to feed in ammunition from one side only. Pulling out a belt which is in the belt feeder and re-introducing another belt into the same feed aperture is therefore very tedious and time-consuming and only possible with the aid of special tools.

Automatic weapons have already been proposed in which it is possible to feed a belt in from two opposite sides of the feeder. The ammunition belts, however, require different belting, designated as left-hand or right-hand belting, and it is also necessary to exchange switching means in the belt feeder in order to transfer from left- to right-hand feed.

The present invention avoids the disadvantages described above by creating a belt feeder with which belts having different types of ammunition can be fed to the weapon in rapid succession by making it possible to feed ammunition into the feeder from three sides, i.e. from the left, from the top and from the right, or when the weapon is inverted, from the right, from the front and from the left.

An ammunition belt feeder according to the invention is characterised by the fact that a feed sprocket for the belt is arranged in such a way with respect to at least two, and preferably three, feed apertures provided in the housing of the belt feeder, and the housing is so constructed, that with the feed sprocket constantly driven in the same direction of rotation it is possible to feed an ammunition belt through any one of the feed apertures at will.

A belt feeder according to the invention differs from those hitherto known in that the transition from one type of ammunition to another or to the feeding of a belt in another feed aperture is possible without changing the switching means in the belt feeder, without the use of tools, and without requiring different belting.

The feed sprocket is connected to the drive in a known manner by means of a ratchet coupling and can be separated from the drive by actuation of a lever, so that an ammunition belt introduced through one of the feed apertures can be pulled out of the belt feeder without any other operation. After the coupling has been re-engaged, another belt with a different type of ammunition can be introduced into the same feed aperture or one of the other feed apertures. The different ammunition belts, which are all belted in the same direction, may be held at the ready in the region of the feed apertures so that a change of ammunition can be effected in the shortest conceivable time. The housing of the belt feeder can be either substantially rectangular or cylindrical in form and consist of pressed sheet-metal parts. With a substantially rectangular housing, the feed apertures are preferably arranged on three sides of the housing, i.e. on the left, on the right and opposite the cartridge ejection aperture.

In the region of the feed apertures, members are provided for guiding the belt links and/or the cartridges of the cartridge belt being introduced. The arrangement of otherwise usual additional centering devices, which serve to straighten the cartridges accurately with respect to the belt links and are generally fitted as special devices in front of the belt feeder, can therefore be omitted.

The feeding of the ammunition belts is further facilitated according to an advantageous sub-feature of the invention by providing the guide members on the outer side of the guide members for the belt links which are pivotally revolved about the support for the belt feeder. The inner surface of the guide members may form an arc-shaped guide path for the cartridges of a belt introduced through a preceding feed aperture. An effective reinforcement of the guide members is thereby achieved, so that the latter can themselves consist of relatively thin sheet-metal plates which are connected, for example by spot-welding, to the flaps which are preferably also made of sheet-metal.

By way of example only, an embodiment of the invention will now be described in greater detail with reference to the accompanying drawings of which:

FIG. 1 is a longitudinal section of the embodiment,
FIG. 2 is a cross-section thereof along the line II—II of FIG. 1,
FIG. 3 is a partial longitudinal section along the line III—III of FIG. 2,
FIG. 4 is a perspective view of two belt links of a cartridge belt,
FIG. 5 is a simplified cross-section along the line V—V of FIG. 1, and
FIG. 6 is a cross section showing a housing of cylindrical form.

Numerals 1 represent the housing of a belt feeder for an automatic weapon, which is itself only partly shown in FIG. 1 and is indicated by broken lines and numbered 2. The belt feeder has on three longitudinal sides, i.e. on the left, on the right and above—as seen in FIG 2—feed apertures 3, 4 and 5 for the introduction of disintegrating cartridge belts comprising links 6 and cartridges 7. The individual links 6 of the belt are of known construction having an arc-shaped central claw 8 which fits loosely round about ½ of the periphery of a cartridge, there being also two further claws 9 spaced from each other by a distance corresponding approximately to the
width of the central claw 8, the further claws fitting more tightly round the adjacent cartridge. The cartridges then form hinge pins for the belt links.

A feed sprocket formed of two star-wheels 10 intermittently conveys the cartridges in a cartridge belt introduced into the feed aperture 3 towards the weapon 2 where they are pushed out of the belt by a lug 11 situated on a reciprocating bolt and into the weapon through a front aperture 12. To accommodate the lug 11, the housing has a slot 12' on the side nearest the weapon.

The housing of the belt feeder may be rectangular as in FIG. 2 or cylindrical as in FIG. 6.

The method of operation of the belt feeder is as follows:

The two star-wheels 10 are mounted on a common hub 13 which is rotatably supported in an end wall 14 of the belt in a recess of a bearing member 16 attached to the end wall and in a second end wall 15 in a bearing sleeve 15' provided on the latter. The drive of the belt feeder can be effected by means of the recoil of the weapon or by output of gas from the barrel. By means of a suitable transmission means (lever of gas-operated piston) a rotary movement in the direction of the arrow (FIG. 5) is imparted to a spring drum 17 mounted in the feeder by subjecting to pressure in the direction of the arrow a cam 26 situated on the outside of the spring drum. In that way the feed star wheels 10 are advanced by one step via pinions 18, 19. The intermittent feed is effected via a ratchet coupling 20 which couples the pinion 19 with a coupling sleeve 21 arranged non-rotatably but resiliently displaceable in a longitudinal direction in the hub 13. The coupling sleeve 21 has a pinion-toothed section 21'. The spring drum 17 is supported on a spindle 22 fixed in the end wall 15 so that it can rotate, to an extent which is determined by stops 23 and 24, against the tension of a spiral spring 25. The inner end of the spring 25 is attached to the spindle 22 while the outer end of the spring is fixed to the spring drum 17.

Whilst the ratchet coupling 20 serves as a feed coupling, a second ratchet coupling 27 acts as a retaining coupling. A coupling sleeve 30 associated with coupling 27 is guided in the bearing member 16 by means of pinion-toothed section 30' so that it is non-rotatable but is longitudinally displaceable. The coupling sleeves 21 and 30 are held constantly in engagement with the ratchet couplings by means of springs 31 and 32 respectively. The star wheels 10, advanced by one step, are thus held fast whilst the spring drum returns to its initial position. The ratchet couplings 20 and 27 are thus effected in opposite directions of rotation. Both couplings can be disengaged by means of a release lever 28 pivotally mounted on the bearing member 16 so that the star wheels 10 are thereby rendered freely rotatable and a belt can be pulled out of the belt feeder.

By actuation of the lever 28 in the direction of the arrow a (FIG. 1) a coupling rod 29 guided inside the hub 13 is displaced, whereby the coupling sleeves 21 and 30 of the ratchet couplings 20 and 27 are disengaged. After the lever 28 is released, it returns automatically under the pressure of the coupling springs 31 and 32 to its initial position. The ratchet couplings 20 and 27 are thus affected in opposite directions of rotation. Without any further operations, another ammunition belt can now be introduced into one of the feed apertures 3, 4 or 5.

In the region of the feed aperture 3, guide members are provided by means of which the belt links are guided centrally between the star wheels 10. For this purpose, two spaced guide edges 33 are provided between which the belt claws 9 are fed to the star wheels 10, the claws sliding on their outer rims 9' along the edges 33. In addition, spring-loaded retainers 34 are provided which reach into the feed aperture 3 and act on the end 9' of the first belt link. The retainers are then pushed up by the first cartridge of the belt. The retainers 34 therefore effect the proper introduction of the first belt link, which contains no cartridge.

The belt is pushed into the belt feeder until the first cartridge is situated over the slot 12'. In this position two levers 35 and 35', spring-loaded in a direction opposite to the rotation of the feed star wheel, press against the cartridge case. The cartridge can now be pushed out by means of the lug 11 (FIG. 1) and the belt link is stripped from the cartridge against the edge of the lever 35 and the feed star wheel 10.

In the region of the feed apertures 4 and 5, guide members are provided which can be pivotally housed in the guide members. These guiding members consist, in each case, of a flap 36, which is held in the position shown in FIG. 2 by means of a spring 38 wound round the pivotal axis 37 of the flap. The flap, made of sheet-metal, forms with its inner surface an arc-shaped guide path for the cartridges of a cartridge belt introduced through one of the preceding feed apertures. Externally, the flaps have guide edges 39 between which the rims 9' of the belt links are guided when a belt is introduced through one of the said feed apertures. The flap is thereby moved by the belt claws 9 into the inside of the belt feeder, between the feed star wheels 10.

In order also to be able to fire belt ammunition held at the ready in magazines, connecting means 40 are provided in the region of the feed aperture 5 for receiving a belt magazine.

1. An ammunition belt feeder for an automatic weapon comprising in combination, a housing, a movable feed sprocket mounted in said housing for advancing an ammunition belt through the feeder, an intermittently-operated drive mechanism, a coupling for connecting and disconnecting said feed sprocket and said drive mechanism, at least two belt feed apertures in said housing adjacent said feed sprocket for guiding ammunition belts to said feed sprocket and positioned relatively to the latter in such manner that the direction of movement of the feed sprocket is constant irrespective of which feed aperture is employed to guide a belt to the feed sprocket, guide members on said housing adjacent said feed apertures for guiding cartridges in a belt, and means for resiliently supporting the guide members in a plane normal to that of a belt when in the feeder, and the guide members being spring-loaded flaps pivotally mounted upon the housing and pivotable against said spring-biasing into the interior of said housing, said flaps also having a surface forming an arc-shaped guide path for cartridges of a belt fed into said housing by a preceding feed aperture.

2. A belt feeder as claimed in claim 1 in which said housing is of rectangular transverse cross-section and has belt feed apertures on three of its sides.

3. A belt feeder as claimed in claim 1 and further comprising a housing of cylindrical form and having a cartridge aperture therein and a plurality of feed apertures spaced at regular intervals round the housing with respect to said cartridge aperture.

4. An ammunition belt feeder for an automatic weapon comprising in combination, a housing, a movable feed sprocket mounted in said housing for advancing an ammunition belt through the feeder, an intermittently-operated drive mechanism, a coupling for connecting and disconnecting said feed sprocket and said drive mechanism, at least two belt feed apertures in said housing adjacent said feed sprocket for guiding ammunition belts to said feed sprocket and positioned relatively to the latter in such manner that the direction of movement of the feed sprocket is constant irrespective of which feed aperture is employed to guide a belt to the feed sprocket, guide members on said housing adjacent said feed apertures for guiding cartridges in a belt, and means for resiliently supporting the guide members in a plane normal to that of a belt when in the feeder, said guide members being spring-loaded levers.

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