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MANUAL GUN CHARGER

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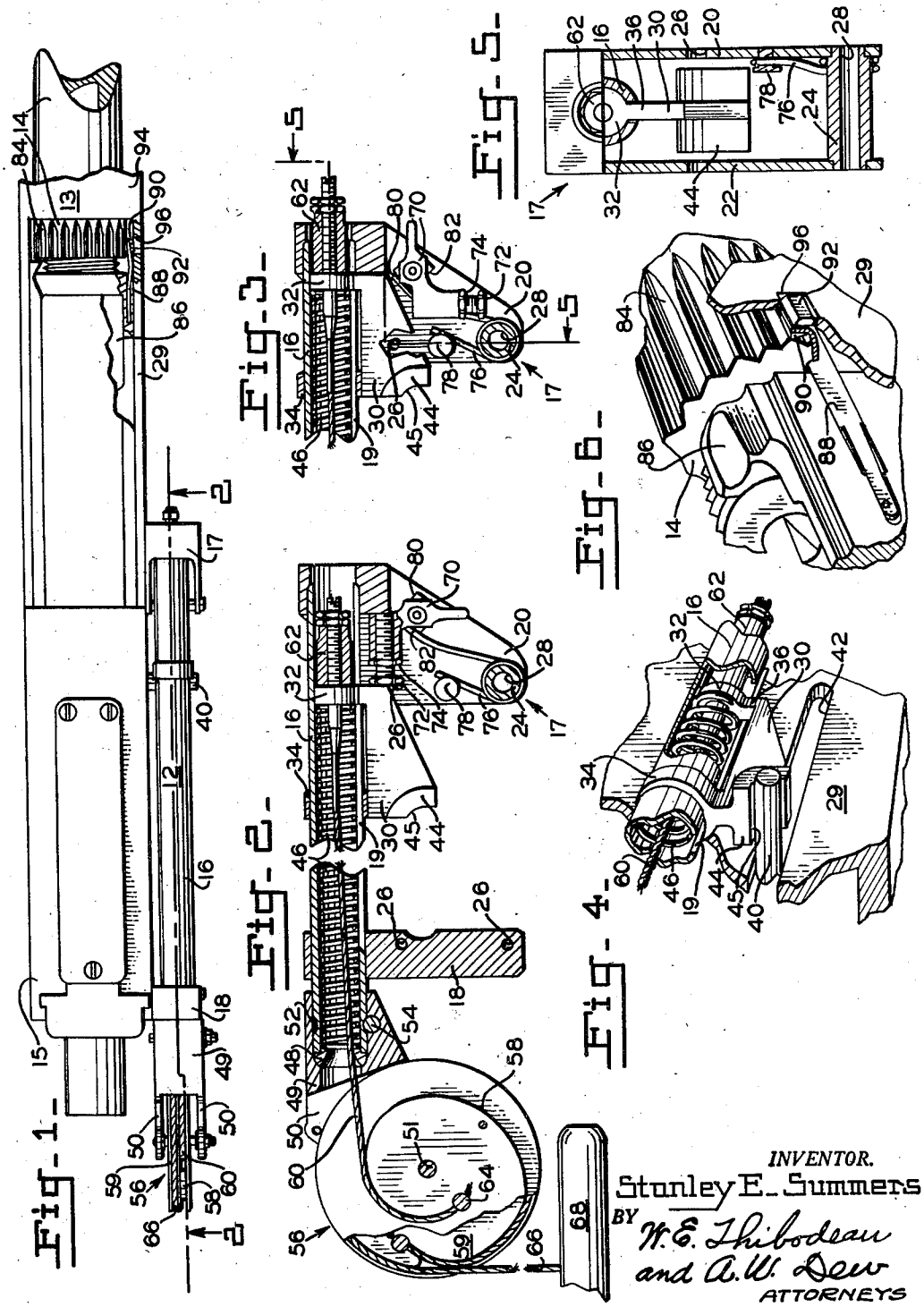

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5.

Fig. 6.

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MANUAL GUN CHARGER

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2 Claims. (Cl. 89—1)

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The invention described herein may be manufactured and used by or for the Government for governmental purposes without the payment of any royalty thereon.

My invention relates to a manual device for charging an automatic gun of the Browning type and more particularly to a manual charging device for an automatic gun designed for a mounting in which the bolt is not readily accessible to the gunner. The device is adapted for operating the bolt of the gun and for arresting the bolt in an intermediate position of the charging stroke to facilitate field adjustment of the head space of the gun.

The breech of the Browning gun barrel is threaded into a barrel extension slidably operating in the receiver of the gun and the position of the gun bolt with respect to the barrel and barrel extension is fixed by the breech lock cam. The distance between the bolt and the barrel in the battery position of the gun is known as the head space of the gun and longitudinal notches are provided around the surface of the barrel adjacent the breech end for adjustment of the relation of the barrel to the barrel extension. A spring-biased detent on the receiver cooperates with the notches to maintain the relation selected.

The adjustment notches are inaccessible for manipulation in battery position of the gun, since in that position, the breech end of the barrel including the notches, is directly beneath the plate forming the feedway of the receiver.

As the gun recoils, the bolt moves rearwardly compressing the drive spring of the gun. The barrel and barrel extension are carried backward with the bolt during the early portion of the charging stroke compressing the buffer spring of the gun so that during this portion of the charging stroke both springs are being compressed. As the gun barrel moves rearwardly to an intermediate position of the charging stroke, the notches are carried to the rear of the feedway and become accessible for head space adjustment. After the barrel arrives at the recoil position thereof the bolt continues in the rearward stroke against the drive spring to engage a cartridge and charge the gun.

A charger for the gun described is required during the charging stroke to furnish the bolt with the variable power required to compress the drive and buffer springs of the gun. Since the device is manually operated, it is advantageous for smooth operation that the operating force required by the device be substantially uniform throughout the charging stroke.

It is an object of my invention, therefore, to provide a manual charger adapted to apply variable power to an automatic gun responsive to a substantially constant force applied to the charger.

Another object of my invention is to provide a charger adapted for arresting the barrel of a recoil-operated gun at a predetermined point in the charging stroke thereof, to allow head space adjustment of the gun.

A further object of my invention is to provide a simple, reliable charging device for an automatic gun that is adapted to be readily attached to the gun.

The gun charger of my invention comprises a guide section and brackets for securing a tubular member of the guide section to a gun, with the tubular member axis in substantially parallel relation with the longitudinal axis of the gun. An actuating member of the charger adapted for engaging a projection of the bolt of the gun is disposed in parallel slidable relation with the tubular member and is biased to a battery position by a spring within the guide member. The gun charger is provided with a pivoted pulley having integral load and power sheaves of respective variable and fixed radii. A power cable provided with a handle is secured to and wound around the power sheave and a load cable is secured at one end to the load sheave at the least radius thereof and adapted to be wound therearound in the direction opposite to the power cable winding. The load cable extends through the actuating member and is further adapted for pulling the actuating member against the spring by means of a stop attached to the opposite end of the cable. A member pivoted on the guide section and provided with a stop is rotatable to bring the stop into position for engagement with the actuating member to arrest the gun barrel in a predetermined adjustment position along the charging stroke.

For a more complete understanding of my invention, reference is made to the following description and the accompanying drawing, in which:

Fig. 1 is a plan view of one embodiment of my invention, assembled to the receiver of an automatic gun;

Fig. 2 is a view along 2—2 of Fig. 1 with a portion broken away and with the stop shown in adjustment position;

Fig. 3 is a partial view similar to Fig. 2 with the stop shown in normal position;

Fig. 4 is a partial perspective view of the gun charger, the receiver side plate and the bolt stud;

Fig. 5 is a view along 5—5 of Fig. 3; and,

Fig. 6 is a perspective cutaway view of the gun receiver in the vicinity of the locking stud aperture therein.

In Fig. 1 of the drawing, gun charger 12 is secured to automatic gun 13 provided with barrel 14 and receiver 16. Gun 13 is shown in head space adjustment position.

Gun charger 12 includes tube 16 secured to bracket 17 and slidably disposed in bracket 18. Tube 16 is provided with longitudinal slot 19. Bracket 17 is provided with bifurcated plate portions 20 and 22 connected by ferrule 24. Mounting holes 26 and hole 28 through ferrule 24 are provided for mounting gun charger 12 to side plate 29 of receiver 15 to maintain the longitudinal axis of tube 16, substantially in parallel relation with the principal axis of gun 13.

Actuating member 30 of gun charger 12 is provided at opposite ends with guide portions for parallel movement with respect to tube 16, including piston portion 32 for movement within tube 16 and ring portion 34 for encircling tube 16. Portion 36 adjacent piston portion 32 moves in slot 19. Bolt stud 40 of gun 13 moves in slot 42 of plate 29 and actuating member 30 is provided with flange portion 44 having an arcuate groove 45 for engaging bolt stud 40. Spring 46 extends between inwardly projecting flange portion 48 of tube 16 and piston portion 32 to bias actuating member 30 to an initial position corresponding to the battery position of gun 13. Bracket 49 provided with bifurcated portions 50, is rotatably mounted on tube 16 by means of circumferential groove 52 of tube 16 and pin 54 secured in bracket 49 and projecting into the groove.

Pulley 56, pivoted at point 51 between bifurcated portions 50, is provided with load sheave 58 of increasing radius and power sheave 59 of constant radius integral with the load sheave for a variable mechanical advantage. Load cable 60 slidably extends through an aperture

in piston portion 32 and is provided with an end stop 62 to prevent cable 60 from being pulled through the aperture. The opposite end of cable 60 is secured to load sheave 58 at point 64 of minimum radius and sheave 58 is disposed for wrapping cable 60 therearound in the direction of increase of the radius thereof. Power cable 66 provided with handle 68 is secured to and wrapped around sheave 58, in the direction opposite to the direction of wrap of cable 60 to cause actuating member 30 to move against spring 46 as a pull is applied to handle 68. Load cable 60 is stretched between point 64 and piston portion 32 to secure maximum mechanical advantage of pulley 56 when actuating member 30 is in the initial position thereof and the mechanical advantage is maintained at high value, corresponding to the steep portion of the radius curve of sheave 58 during the portion of the charging stroke in which the bolt and barrel 14 together are carried backward. The mechanical advantage of pulley 56 decreases to a minimum for the remainder of the charging stroke when the bolt is carried back without the barrel.

Member 70 pivotally mounted between plate section 20 and 22 is provided with an adjustable stop 72 secured by lock nut 74. Spring 76 is wrapped around ferrule 24 and restrained between pin 78 secured to plate section 20 and either of the longitudinal plane surfaces 80 or 82 of member 70. Surface 80 is arranged for engagement with spring 76 to maintain pivoted member 70 in normal position as in Fig. 3 and the spring 76 engages surface 82 to maintain pivoted member 70 in adjustment position as in Fig. 2. In the adjustment position, stop 72 engages actuating member 30 to prevent return of member 30 to the initial position.

The breech end of the gun barrel 14 is threaded and longitudinal notches 84 are provided in the surface adjacent the breech end of the barrel. Barrel extension 86, slidably disposed in receiver 15, is adapted for engaging the threaded end of barrel 14 and for compressing the buffer spring of gun 13 upon recoil of barrel 14. Barrel locking spring 88, secured to barrel extension 86, is provided with detent 90 and locking lug 92 opposingly mounted thereon and is adapted to bias detent 90 into one of the notches 84. Gun barrel 14 is rotated by screw driver manipulation of notches 84 to alter the relation of gun barrel 14 with respect to barrel extension 86 thereby to change head space adjustment of gun 13. Locking lug 92 engages side plate 29 of receiver 15 to retain detent 90 in engagement with notches 84.

Notches 84 are covered by feedway 94 of receiver 15 in the battery position of gun 13. As gun barrel 14 and barrel extension 86 are moved rearwardly during the charging stroke, notches 84 move to the rear of feedway 94 and become accessible for manipulation. Aperture 96 is provided in side plate 29 and stop 72 is adjusted to bring lug 92 opposite aperture 96 in the adjustment position to allow barrel 14 to be rotated.

As barrel 14 is rotated, an audible click is produced when each of the notches 84 passes detent 90 and adjustment is made by first rotating gun barrel 14 into closest engagement with barrel extension 86. The barrel is then rotated in the opposite direction until a specific number of clicks denotes the required relative position of the barrel and barrel extension.

In many automatic weapons the initial force required to be applied during the charging stroke is high due to such causes as fouling of the parts with carbon deposits

from discharge or drying of packing in a water cooled weapon. The recoiling assemblies of still other automatic weapons have high starting inertias due to heavy barrels and the consequently strong recoil springs therefor. For such weapons, the charger described above or modifications thereof would be advantageous.

While the foregoing is a description of the preferred embodiment, I intend in the following claims to include those modifications and variations that are within the spirit and scope of my invention.

I claim:

1. A charger for an automatic gun comprising a body having a tubular guide member adapted for attachment to the gun with said guide member in substantially parallel relation with the principal axis of the gun, an actuating member adapted for operation in parallel relation to said guide member and for engagement with the bolt, a spring restrained between a flange of said guide member and said actuating member to bias said actuating member to an initial position corresponding to the battery position of the bolt, a member provided with bifurcated portions and pivoted on said guide member, a pulley pivoted between said bifurcated portions and provided with integral sheaves including a power sheave of constant radius and a load sheave of increasing radius, a load cable stretched between the point of minimum radius on said load sheave and said actuating member in said initial position, a power cable secured to said power sheave and wrapped therearound in the direction opposite to the direction of increase of said load sheave radius, said power cable being provided with a handle and load pulley being responsive to a force applied to said handle for wrapping said load cable on said load sheave to apply pull to said actuating member and thereby to operate the bolt in the charging stroke thereof, said pull varying from maximum value in said battery position to minimum value during said charging stroke, and a member provided with an adjustable stop and pivotally mounted on said body between normal and adjustment positions, said stop being adapted in the adjustment position of said pivot member to arrest said actuating member in a predetermined position along said charging stroke.

2. A charger for a gun including a receiver and a bolt biased to a battery position therein, and disposed to slide rearwardly in a charging stroke, comprising a body secured to the receiver, a member axially pivoted on said body, an integral pulley journaled in said member including a circular power sheave and a spiral load sheave, an actuator biased to a normal position corresponding to the battery position, and load and power cables, said load cable being stretched between said actuator in said normal position and the point of minimum radius on said load sheave and wrapped therearound in the direction of increasing radius thereof, and said power cable being secured to said power sheave and wrapped oppositely therearound for axial slidable operation of said actuator to project the bolt in the charging stroke responsive to a substantially constant pull on said power cable.

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