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AUTOMATICALLY OPERATED VARIABLE SHOTGUN CHOKE

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8 Claims. (Cl. 42—79)

This invention relates to a variable shotgun choke which is constructed and arranged to be operated by the force of the expanding combustion gases to automatically actuate parts of the choke which are movable in response to the force of the expanding gases for constricting the muzzle of the piece.

More particularly, it is an aim of the present invention to provide an automatically variable shotgun choke which will operate automatically upon firing of one shell to constrict the muzzle of the shotgun to a desired extent for concentrating the shot patterns of subsequently fired shells.

Another object of the invention is to provide a shotgun choke which may be manually adjustable for regulating the extent that the muzzle will be constricted by the force of the expanding gases resulting from the next firing of the gun, or which choke can be so adjusted manually that no constriction of the muzzle will result from subsequent firing of the piece.

Still a further object of the invention is to provide an automatically operated manually regulated choke of the aforescribed character of extremely simple construction, composed of a minimum number of parts, which may be quickly applied to or removed from a shotgun barrel, and which is capable of being quickly assembled or dismantled.

Various other objects and advantages of the invention will hereinafter become more fully apparent from the following description of the drawing, illustrating a presently preferred embodiment thereof, and wherein:

Figure 1 is a longitudinal sectional view partly in elevation showing the automatic choke in an applied position and with the parts arranged so that no constriction of the muzzle is effected by the choke;

Figure 2 is a longitudinal sectional view showing the choke in an applied position and with the muzzle fully constricted thereby;

Figure 3 is a cross sectional view through the choke, taken substantially along a plane as indicated by the line 3—3 of Figure 1, and

Figure 4 is a fragmentary plan view of a portion of the choke shown in an applied position, and with the parts disposed as in Figures 1 and 3.

Referring more specifically to the drawing, the automatically operated variable shotgun choke in its entirety and comprising the invention is designated generally 6 and includes a collet, designated generally 7, having an annular rear portion 8 the rear part of which is internally recessed and threaded, as seen at 9, to threadedly engage the externally restricted and threaded muzzle end portion 10 of a shotgun barrel 11. The collet 7 has an elongated forward end portion 12 which is externally tapered and longitudinally split by a plurality of longitudinally extending slots 13 which open outwardly of the forward end thereof to form a plurality of fingers 14 which are capable of being constricted. A bore 15 of the collet 7 which extends from the forward end thereof back to the

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enlarged threaded bore portion 9 is normally of uniform diameter. The collet 7 has an annular shoulder 16 which faces forwardly and which is formed by the forward end of the rear collet portion 8 and which is disposed around the rear end of the tapered exterior 17 of said forward end portion 12.

A connecting collar 18 of substantial length has a bore 19 of uniform diameter extending from end to end thereof, a portion of which slidably fits around and engages on the periphery of the rear collet portion 8. The connecting collar 18 is of a length substantially greater than the length of the collet portion 8 and has an externally restricted and threaded forward end portion 20 and an externally restricted and threaded rear end portion 21. The collar 18 includes a portion 22 located immediately behind its threaded forward portion 20 and which is of larger exterior diameter than the remainder of said collar. The collar 18 also includes a portion 23 of uniform exterior diameter, located between the collar portions 21 and 22 and which is of larger outer diameter than said portion 21 and of smaller outer diameter than the portion 22, as clearly illustrated in Figures 1 and 2. The collar 18 has an annular rearwardly facing shoulder 23a at the rear end of its enlarged portion 22 and which faces toward said portion 23.

A nut 24 has a bore 25 sized to fit turnably and slidably about the periphery of the barrel 11 and which has a sufficiently close fitting engagement therewith to provide a substantially gas-tight seal. The nut 24 has a forwardly extending annular flange 26 which is internally threaded to threadedly engage the collar portion 21 for connecting said nut and collar. The periphery of the flange 26 is smooth and of the same diameter as the exterior of the collar portion 23 to provide a continuation thereof. The nut 24 has an outer portion projecting radially to beyond the periphery of the flange 26 and forming a forwardly facing annular shoulder 27.

A sleeve valve 28 fits rotatably and non-slidably on the collar portion 23 and on the exterior of the flange 26 and is retained against sliding movement relative to the choke assembly 6 by the shoulders 23a and 27 between which the sleeve valve 28 is retained. As best seen in Figure 4, the sleeve valve 28 is provided with three circumferentially elongated slots 29, 30 and 31 which are circumferentially and longitudinally spaced relative to one another to coax with three longitudinally aligned radial bores 29a, 30a and 31a, respectively, formed in the collar portion 23.

The shoulder 32, defining the rear end of the collet portion 8, combines with the rear end of the bore 19, which is spaced from the periphery of the barrel 11 and with the inner portion of the nut 24 to define an annular chamber 33 around a forward portion of the barrel 11, which is located immediately behind the threaded barrel portion 10. The barrel 11, behind and adjacent its threaded muzzle end 10 is provided with a radial port 34 the outer end of which opens into said chamber 33.

A sleeve 35 forming a constricting member has an internally enlarged and threaded rear end 36 which threadedly engages the threaded forward end 20 of the collar 18. Said constricting member 35 has a bore 38 extending from its enlarged rear end, defined by said internally threaded portion 36, to its forward end and which is uniformly tapered forwardly of said constricting member 35. The enlarged rear end of the bore 38 is of substantially smaller diameter than the threaded portion 36 to define an annular rearwardly facing shoulder therebetween, the inner annular portion 37 of which shoulder extends inwardly from the bore 19 of the collar 18.

With the automatically operated variable shotgun choke in an applied position, as illustrated in Figure 1, the

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sliding assembly thereof including the parts 18, 24, 28 and 35 are disposed in a forwardmost position relative to the stationary collet 7, which constitutes the only fixed or stationary part of the assembly 6. With the slidably movable parts in a forwardmost position, the constrictable fingers 14 are in fully expanded positions so that the collet bore 15 is of uniform diameter from end to end thereof and of a diameter corresponding to the diameter of the bore of the barrel 11. Thus, in the position of Figure 1, the assembly 6 does not function as a muzzle choke but rather the bore 15, which constitutes the muzzle or muzzle extension, provides a "cylindrical bore." Assuming that the port 29 of the sleeve valve 28 is disposed in registration with the port 29a of the collar portion 23, as illustrated in Figures 1, 3 and 4, when the piece is fired the expanding gases of combustion from the powder will escape from the barrel through its port 34 into the chamber 33 from which said gases will be immediately vented to the atmosphere through the registering ports 29a and 29 so that little or no pressure will be developed in the chamber 33 and consequently no movement of the aforementioned slidable parts will occur relative to the fixed collet 7. Thus, the piece may be fired any number of times with the sleeve valve 28 disposed as seen in Figures 1, 3 and 4, without resulting in any movement of the choke parts.

However, by merely rotating the sleeve slightly about the collar 18 the port 29 can be moved out of registry with the port 29a and the port 30 can be brought into registry with the port 30a. Assuming that this has been done and that the choke assembly 6 is otherwise disposed with its parts in the positions as illustrated in Figure 1, when the piece is again fired the expanding powder gases will escape from the barrel through the port 34 into the chamber 33 in which said gases will be confined due to the fact that the port 29a is closed. Accordingly, the expanding gases will impinge against the immovable rearwardly facing shoulder 32 and against the forwardly facing shoulder 39 of the nut 24. The pressure of the gases against the shoulder 39 will cause the slidably movable connected parts 18, 24, 28 and 35 to slide rearwardly or from right to left relative to the barrel 11 and collet 7 until the port 30a is disposed to communicate with the chamber 33, so that the gases may escape from the chamber 33 through said port 30a and the port 30 which is in alignment therewith. This rearward movement of the parts will result in the constrictor 35 sliding rearwardly relative to the constrictable fingers 14 and as the bore 38 conformably engages the tapered exterior of the fingers 14, as said tapered bore moves rearwardly the fingers 14 will be constricted to thus constrict the forward end of the bore 15. In this manner, a partial choke of the muzzle will be automatically produced after the first firing of the piece and will be maintained for subsequent firings so long as the position of the sleeve valve 28 is left unchanged and the slidable assembly is not manually moved longitudinally relative to the collet 7.

In a like manner, the sleeve 28 could have been initially turned from its position of Figures 1, 3 and 4 to its position of Figure 2 with the port 31 in registration with the port 31a and the ports 29a and 30a closed. With this adjustment of the sleeve valve 28, on the first firing of the piece thereafter, expanding gases acting against the surface 39 will cause the slidably movable parts to be displaced rearwardly relative to the collet 7 and barrel 11 from their positions of Figure 1 to their positions of Figure 2, to provide a "full choke" with the bore 15 restricted at its forward end to a maximum extent so that the resulting shot pattern will be of a minimum size.

It will be understood that the length of travel of the movable parts may be varied and the number of ports formed in the collar portion 23 and sleeve valve 28 may likewise be varied to increase to any desired number the different choke adjustments which may be produced by the device 6. The shoulder 37 travels toward the should-

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der 16 which forms an abutment for said shoulder 37 to positively limit the extent that the slidably movable parts can move rearwardly relative to the collet and barrel.

The choke 6 is applied to the barrel 11 by inserting the forward end of the barrel through the nut bore 25 and screwing the collar 18 onto the barrel portion 10, and removed therefrom by reversing this procedure. The choke assembly 6 may be readily dismantled by unscrewing the constrictor sleeve 35 and nut 24 from the collar 18 after which the sleeve valve 28 can be slidably detached from said collar and the collar slidably detached from the collet 7.

Various modifications and changes are contemplated and may obviously be resorted to, without departing from the spirit or scope of the invention as hereinafter defined by the appended claims.

I claim as my invention:

1. A shotgun choke of the character described comprising a collet having a rear end detachably connected to the muzzle end of a gun barrel and extending forwardly therefrom, said collet having an externally tapered constrictable forward portion and having a bore extending longitudinally therethrough and registering with the barrel bore, a slidable assembly slidably engaging said collet and including a portion having a tapered bore conformably fitting slidably on said constrictable forward portion of the collet, said slidable assembly including a rear portion having a close fitting sliding engagement on the barrel rearwardly of the collet, said slidable assembly including a rear bore portion of larger diameter than the exterior of said barrel and combining therewith and with said rear portion of the slidable assembly and the rear end of said collet to define an annular chamber surrounding a part of the barrel, means forming a passage connecting said chamber and the barrel bore adjacent the rear end of said collet, and valve means forming a part of said slidable assembly including longitudinally spaced ports and a manually adjustable part for adjustably positioning selected ones of said ports in communication with the atmosphere and with said chamber for varying the extent that said slidable assembly will be displaced rearwardly of the collet and barrel when the piece is fired.

2. A choke as in claim 1, said manually adjustable part comprising a sleeve valve having longitudinally and circumferentially spaced openings forming portions of said ports, said sleeve valve being slidably movable with the slidable assembly and being rotatable relative to the remainder of said slidable assembly.

3. A choke as in claim 1, said collet having a rear portion of larger exterior diameter than the exterior diameter of said barrel and constituting a fixed forward end of said chamber.

4. A choke as in claim 3, said slidable assembly including an elongated collar having a bore of uniform diameter slidably engaging said rear collet portion and extending rearwardly therefrom, a rear portion of said collar having longitudinally spaced radial passages forming parts of the ports of said valve means.

5. A choke as in claim 4, a sleeve valve forming the manually adjustable part of said valve means rotatably mounted on the rear end of said collar and having longitudinally and circumferentially spaced openings selectively movable by rotation of the sleeve valve into registration with the passages of said collar.

6. A choke as in claim 5, said collar having a rearwardly facing exterior annular shoulder, said rear part of the slidable assembly including a nut having a bore slidably engaging said barrel, said nut being detachably connected to the rear end of said collar and having an exterior forwardly facing shoulder cooperating with the collar shoulder and between which shoulders said sleeve valve is rotatably and non-slidably mounted.

7. A choke as in claim 6, and a sleeve constituting a part of said assembly and forming a constrictor member, said sleeve having an internally enlarged rear end detach-

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ably connected to the forward end of said collar and having a bore extending therethrough and tapered toward the forward end thereof in which the externally tapered forward end of said collet conformably fits for constricting the forward end of the collet bore when said con- 5
strictor member is displaced rearwardly relative to the collet with said slidable assembly.

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8. A choke as in claim 7, said forward collet portion comprising a plurality of elongated circumferentially spaced fingers.

No references cited.