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ADJUSTABLE GUN CHOKE AND METHOD OF CONSTRUCTING THE SAME.

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2 Sheets-Sheet 1

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Fig. 5.

Fig. 6.

Fig. 2.

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This invention relates to adjustable choke devices for the end of a gun barrel and methods of constructing the same and consists in improvements designed to render such devices more efficient than heretofore, as well as convenient and simple in the method of handling.

The invention will be best understood by reference to the following description when taken in connection with the accompanying illustration of one specific embodiment thereof, while its scope will be more particularly pointed out in the appended claims.

In the drawings:

Fig. 1 is a side elevation of the end of a gun barrel equipped with a choke device embodying one form of the invention;

Fig. 2 is a similar view on an enlarged scale and partly in section to show the internal construction;

Fig. 3 is an end elevation of the choke device shown in Fig. 2;

Fig. 4 is a cross-sectional elevation on the line 4—4 in Fig. 2; and

Figs. 5, 6 and 7 are views each embodying an end elevation and a longitudinal section, more or less diagrammatic, to illustrate the principle utilized in the construction of the choke.

Referring to the drawings and to the embodiment of the invention therein shown for illustrative purposes, the gun barrel 11 has an externally threaded end on which there is firmly screwed to a shouldered seat the hollow cylindrical shell 13 which projects forwardly from the end of the barrel and the interior of which provides an extension of the gun bore. The forward end of the shell 13 is separated into a number of segments 15 (herein six in number) by means of slots 17 which extend parallel to the axis of the shell from the forward end thereof to a point spaced from the end of the gun barrel, terminating each in a circular enlargement 19, the advantages of which, both from its circular shape and enlarged character, are hereinafter set forth.

While in the described embodiment the choke shell 13 is in the form of a separate attachment applied by threaded engagement to the end of the gun barrel, it may, if desired, be formed by the end of the gun barrel itself, or, as a separate piece, may be applied and fastened to the gun barrel by other methods than by threading the same thereon.

A choke adjusting sleeve 21 is over the projecting end of the choke shell and is in threaded engagement with the rearward, unsloated, externally threaded portion of the shell. The forward or outer end of the adjusting sleeve has a contracted, internally beveled end 23 to overlie and engage with a correspondingly beveled end of the choke shell. By turning the sleeve on the choke shell, the sleeve may be screwed rearwardly on the shell, causing the segments to spring inwardly through the action of the beveled end 23 of the sleeve. Through this means any desired degree of choke may be secured, the full choke position being reached when the ends of the segments contact each with its adjoining one, the width of the slots 17 being sufficient to give the desired range of choke.

The exterior rear end of the sleeve 21 is provided with graduations 25 (herein six in number) suitably designated and cooperatively positioned with relation to some fixed reference point on the shell, such as the sight 27, so that the rotative position of the adjusting sleeve on the shell may at all times be indicated to the user of the gun and the latter may be aware of the adjustment of the choke, whether full choke or some fractional part thereof.

Cooperating with the graduated indicator is a stop or positing device adapted to hold the adjusting sleeve in its rotative movement at any point to correspond to one of the graduations on the sleeve. For this purpose the sleeve 21 is provided with an external, circumferential groove 29 in which there is seated an encircling split spring-ring 31, one end 33 of which is bent inwardly and protruding through an opening in the sleeve at the bottom of the groove 29, has a beveled tip which is adapted to enter any one of the slots 17, as indicated in Figs. 2 and 4.

When the sleeve is turned on the shell, the beveled, in-turned end 33 of the resilient ring is forced out of the slot 17 and rides over...
the walls of the shell, snapping into and out of each successive slot until the sleeve is brought to rest at the desired point of choke, when the beveled end 33 snaps into the corresponding underlying slot and holds the sleeve fixed in its assigned position, serving as a resilient click stop or positioning and locating device.

Preferably the pitch of the threads between the sleeve and the choke shell is such that one complete rotation of the sleeve provides the desired range of adjustment, from the full open to the full closed choke positions.

The curved walls of the circular slot-terminals 19 at the ends of the slots 17 minimize any tendency of the walls of the sleeve to rupture in line with the slots under the explosive action of the gun; and the enlarged character of the slot terminals 19 is particularly desirable to localize the bend of the choke segments at the said ends thereof. The enlargements at the ends 19 of the slots results in a weakening of the resistance to bending of the segments thereat, so that upon choking of the gun most of the bend occurs at the roots of the segments with the result that a rectilinear taper is approximated, whereas the segments of choke not weaker at their roots than in their length tend to bend progressively from their roots to their tips giving a curvilinear taper resulting in a less uniform shot pattern.

In adjustable choke attachments as heretofore constructed, the split or segmental choke shell has been provided with a bore which is truly cylindrical and constitutes a cylindrical extension of the bore of the gun barrel when the shell is expanded so that the segments are in line with the barrel bore. When a shell so constructed, however, is contracted by springing the ends of the segments together to the full choke position, the inner periphery of the choke shell becomes more or less distorted out of a truly cone-shaped surface.

The effect of this will be apparent from Figs. 1 and 2, where, for simplicity, there is shown a cylindrical choke device 35 split into four segments 37 by means of the slots 39 of exaggerated width. The choke device 35 may be either the end of the barrel itself or a separate shell attachment. In its normal or open position, as shown in Fig. 5, the bore of the shell is a true cylinder and each cross section thereof is circular in form and composed of four concentric arcs 41. If the ends of these segments are sprung together, however, as shown in Fig. 6, any cross-section of the slotted portion of the shell is no longer circular in form but is composed of the four arcs 41 which are now non-concentric. The inner surface of the bore therefore does not conform to the surface of a cone but departs materially therefrom.

The concentrating action of the choke on the discharge from the gun depends upon a ricochet action which is most pronounced under conditions of full choke. To secure a uniform distribution of the shot when the choke is used this action should be as nearly uniform as possible in different circumferential portions of the bore. In the case of a choke shell constructed on the principle represented in Figs. 5 and 6, I have found that the pattern produced tends to be inefficient, irregular and non-uniform, apparently due to the departure of the bore of the choke shell from a conical form.

In constructing the choke shell disclosed in Figs. 1 to 5 inclusive, this condition is avoided so that, at the target or object shot at, a greatly improved and more efficient pattern is provided for by so forming the bore of the shell that when contracted to a full choke position the bore has a truly conical shape, the inner periphery of each cross section thereof being circular in form. Such a condition for comparison is represented in Fig. 7.

This result is secured by first forming the choke shell with a cylindrical bore. The shell is then split to form the desired number of separated segments. The adjusting sleeve 21 is then screwed on to the choke shell so that the maximum contraction is had and the ends of the segments are sprung into contact with each other. In this condition of maximum contraction, suitably tapered reamers, having the correct amount of taper to produce the desired cone for the full choke position, are inserted and the interior reamed out so that a true cone-shaped bore is produced throughout, changing the shell from a condition which may be represented in Fig. 6 to that which may be represented in Fig. 7.

With the choke shell constructed under this plan, when the segments are sprung together into the full choke position, the coke assumes a true cone-shape, providing a highly efficient pattern for longer ranges, with a much more uniform distribution of the shot both at full choke and partial choke positions.

As above pointed out, the weakening of the roots of the segments 15, as by the enlargement of the terminal ends of the slots at 19, results in a more nearly rectilinear taper of the segments in all degrees of contraction, and this feature may be employed to produce an improved shot pattern without reaming the contracted segments to a truly conical bore. Similarly, the reaming to truly conical form at full choke position of a bore in which the segments are of uniform bending strength throughout before reaming, provides an improved shot pattern at partial choke position as well as at full choke position, even though the tips of the segments are thinned more than the roots thereof with the result that at full open position they have a minute flare. However, by employing segments both adapt-
5 ed to bend more freely at their roots and defining a truly conical bore when fully contracted, an additional improvement is effected in that the tips of the segments are maintained somewhat thicker, because the reaming operation need not remove so much metal at the tips to straighten out the curve of bending of the segments into a rectilinear wall, with the result that the tips have little tendency to produce even a minute flare of the bore when the choke is in full open condition, and a very nearly rectilinear taper of the choke is obtained at all positions from full choke to full open.

10 While I have herein described and shown for the purpose of illustration one specific embodiment of the invention, it is to be understood that extensive deviations may be made therefrom, all without departing from the spirit thereof.

I claim:

1. The method of forming a choke shell for a gun barrel which consists in constructing a metal shell having a cylindrical bore, separating one end of the shell into longitudinal segments, contracting the separated end of the shell, and, while the latter is held contracted, shaping the bore into cone-shaped form.

2. An adjustable choke for gun barrels comprising a shell portion, the mouth of which has rearwardly extending slots leaving an unslotted rear portion, said slots separating the end of the shell into spaced segments, and an adjusting sleeve fitting over and bearing against the slotted end of the shell and having threaded engagement with the unslotted portion of the shell, whereby rotation of the sleeve serves to contract the mouth of the shell, said shell when contracted to full choke position being shaped to present a true cone-shaped bore.

3. An adjustable choke for gun barrels comprising a shell portion having its mouth separated into detached segments, with means to contract the mouth of said shell to provide a choked condition, said shell when fully contracted presenting a bore of true cone-shaped form.

4. An adjustable choke for gun barrels comprising a choke shell, the mouth of which is longitudinally slotted, a choke adjusting sleeve fitting over said shell and having threaded engagement therewith and bearing against the slotted end of the shell, whereby rotation of the sleeve serves to contract the mouth of the shell, said sleeve having an external circumferential groove, and a resilient ring seated in the groove to hold the sleeve end protruding through an opening in the sleeve, whereby the protruding end of the ring is adapted to enter one of the longitudinal slots in said sleeve and serve as a resilient positioning device for the sleeve.

5. An adjustable choke for gun barrels comprising a slotted choke shell portion, a choke adjusting sleeve rotatably mounted on the shell, and a resilient positioning device carried by the sleeve and adapted to engage with successive slots in the shell.

6. An adjustable choke for gun barrels comprising an adjustable choke shell portion, an adjusting sleeve mounted thereon, and a resilient positioning and locating device carried by the sleeve.

7. An adjustable choke for gun barrels comprising an adjustable choke shell portion, a choke adjusting member cooperatively related thereto, a positioning and locating device to position said member in any one of the successive positions of adjustment, and an indicator to indicate the degree of choke.

8. An adjustable choke for gun barrels comprising a slotted choke shell portion, a choke adjusting sleeve fitting over said shell portion and having threaded engagement with a part connected therewith, whereby said sleeve may be turned step by step to a plurality of positions to secure different degrees of choke between full open and full choke positions, and a resilient positioning and locating device carried by the sleeve to locate the sleeve in its step by step positions corresponding to different degrees of choke and prevent accidental displacement therefrom.

9. An adjustable choke for gun barrels comprising a slotted choke shell portion, a choke adjusting sleeve fitting over said shell portion and having threaded engagement with a part connected therewith, whereby said sleeve may be turned step by step to a plurality of positions to secure different degrees of choke between full open and full choke positions, a resilient positioning and locating device carried by the sleeve to locate the sleeve in its step by step positions corresponding to different degrees of choke and prevent accidental displacement therefrom, and a scale for indicating the rotative position of the sleeve whereby the degree of choke is readily ascertainable.

10. An adjustable choke for gun barrels having a choke shell, a choke adjusting sleeve thereon forming part of said shell and adapted to be turned to at least three predetermined positions of adjustment thereon corresponding to three predetermined adjustments of the choke, said parts being proportioned so that at least three of said predetermined positions lie within a single rotation of the sleeve, and indicating means associated with said choke adjusting sleeve and indicating said predetermined positions of adjustment thereof to provide for ready setting, checking or changing of the adjustment of the choke.

11. An adjustable choke according to claim 10 in which said indicating means consists of an index and a scale arranged to provide a full range of adjustment for the choke.

12. An adjustable choke for gun barrels comprising an adjustable choke shell portion, a choke adjusting sleeve rotatably mounted on the shell, and a resilient positioning device carried by the sleeve and adapted to engage with successive slots in the shell.

13. An adjustable choke for gun barrels comprising a slotted choke shell portion, a choke adjusting sleeve rotatably mounted on the shell, and a resilient positioning and locating device carried by the sleeve.

14. An adjustable choke for gun barrels comprising an adjustable choke shell portion, a choke adjusting member cooperatively related thereto, a positioning and locating device to position said member in any one of the successive positions of adjustment, and an indicator to indicate the degree of choke.

15. An adjustable choke for gun barrels comprising a slotted choke shell portion, a choke adjusting sleeve fitting over said shell portion and having threaded engagement with a part connected therewith, whereby said sleeve may be turned step by step to a plurality of positions to secure different degrees of choke between full open and full choke positions, and a resilient positioning and locating device carried by the sleeve to locate the sleeve in its step by step positions corresponding to different degrees of choke and prevent accidental displacement therefrom, and a scale for indicating the rotative position of the sleeve whereby the degree of choke is readily ascertainable.
about the choke to relatively widely separate
the indicated predetermined positions of ad-
justment.

12. An adjustable choke for gun barrels,
having a shell portion segmentally divided
at its mouth by longitudinally extending slots
and means to contract the mouth of said shell
portion to provide a choked condition and in
which the terminal ends of the slots remote
from the mouth of the shell portion are en-
larged to provide for more ready bending of
the segments thereat than in their lengths.

13. An adjustable choke for gun barrels,
having a shell portion segmentally divided
at its mouth by longitudinally extending
slots and means to contract the mouth of said
shell portion to provide a choked condition
and in which the ends of the segments remote
from the mouth of the shell-portioned are
partially cut-away to render the segments
more readily bendable thereat than in their
lengths.

14. The method of forming a choke shell
for a gun comprising the steps set forth in
claim 1 and further consisting in weakening
the segments adjacent their attached ends to
cause them to bend more freely thereat be-
fore shaping the bore into cone-shaped form.

15. An adjustable choke according to
claim 3, in which said segments are more
readily bendable at a point remote from the
mouth of the choke than in their intervening
lengths.

In testimony whereof, I have signed my
name to this specification.

EZEKIEL F. WHITE.