

Dec. 15, 1953

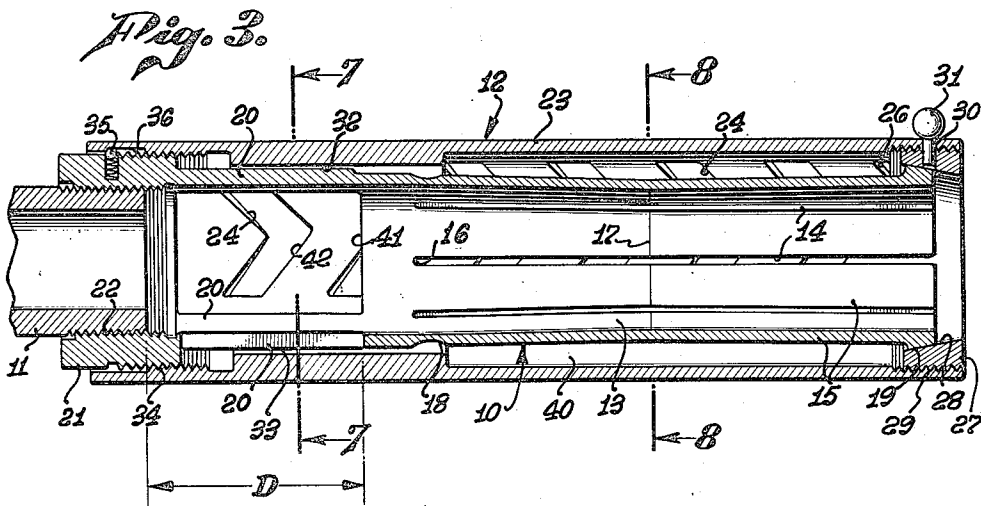
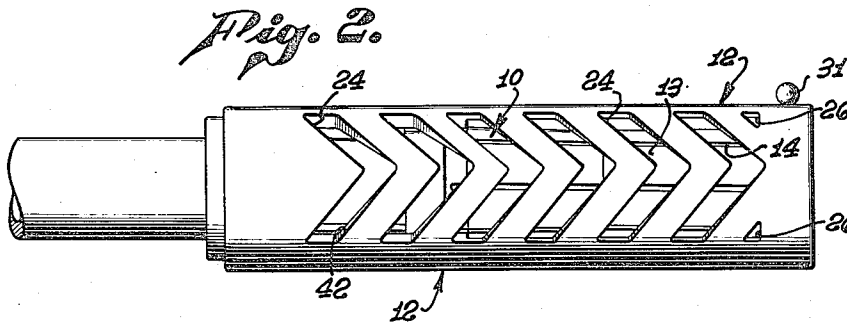
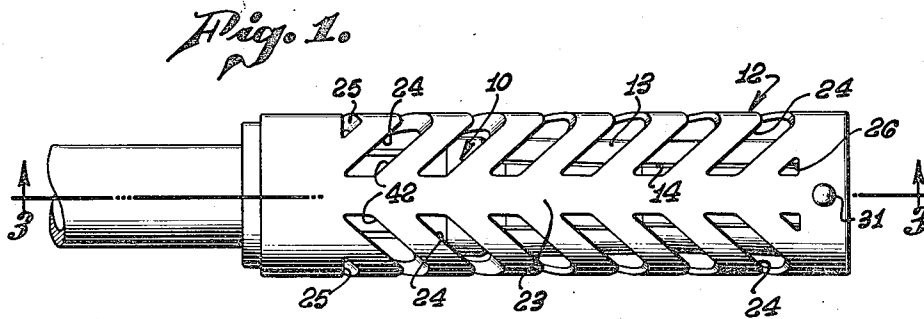
E. B. POWELL

2,662,326

SHOTGUN MUZZLE DEVICE

Filed Dec. 18, 1948

2 Sheets-Sheet 1



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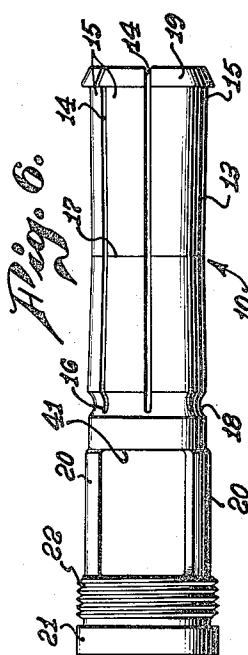
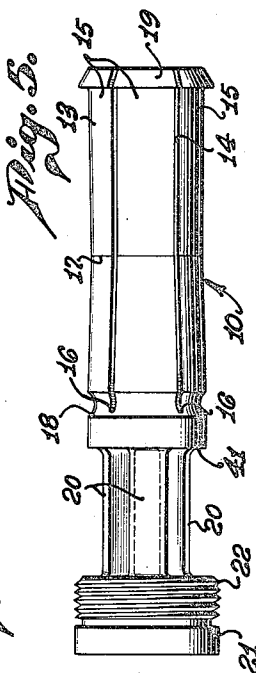
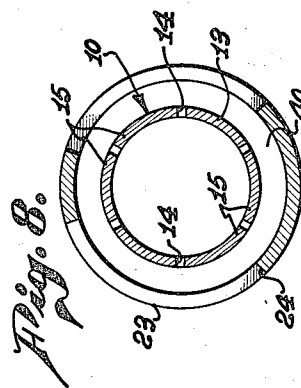
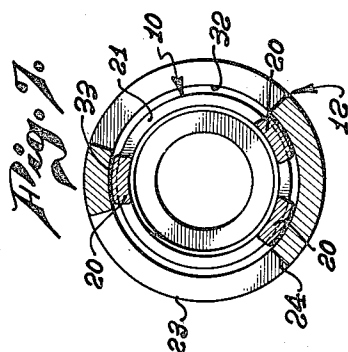
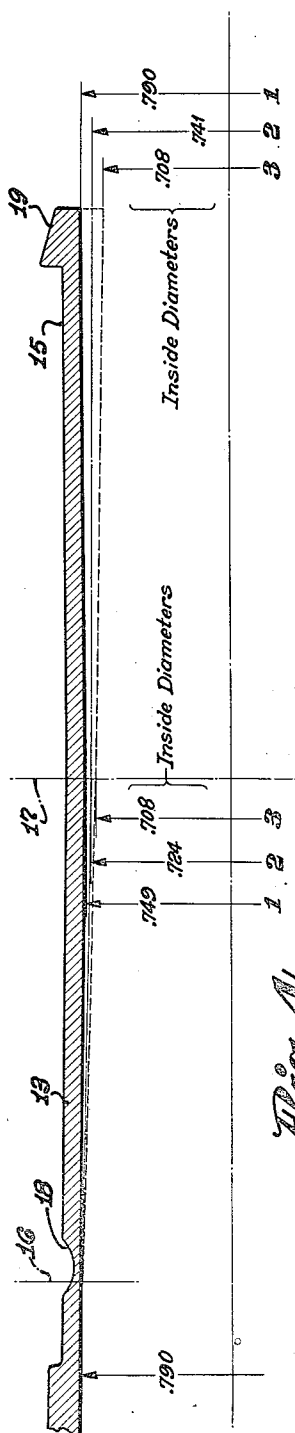
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SHOTGUN MUZZLE DEVICE

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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

2,662,326

SHOTGUN MUZZLE DEVICE

Edward Baden Powell, Pasadena, Calif.

Application December 18, 1948, Serial No. 66,075

5 Claims. (Cl. 42-79)

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This invention relates generally to improved muzzle devices for fire arms of the shot gun type discharging a scatter shot charge, and concerns more particularly novel means for controlling the shot pattern and firing characteristics of such a gun.

As is well known in the art, it is often desirable to employ a pattern control or choke tube in conjunction with a shot gun in order to attain a desired shot density or pattern at a particular range. Of course, the optimum degree of choke varies with the range, and therefore certain adjustable chokes having variable internal diameters have been suggested. A major object of the present invention is to provide a novel muzzle device characterized by such an ability for adjustment to various conditions of choke and adapted also for venting the gases of combustion in a most effective manner.

In accordance with the invention, I employ, in combination, an adjustable choke tube adapted to be mounted in spaced relation to the muzzle end of a gun barrel to permit escape of the combustion gases prior to exit of the charge from the device, a cage positioned about the tube, and having apertures through which the escaping gases are vented, and means carried by the cage and engaging the choke tube to controllably vary its internal diameter. Preferably, the tube is adapted for bore constriction in response to movement of the cage. For this purpose, the cage or choke tube may present a wedge surface or may carry a wedge ring operable to effect the defined tube constriction in response to cage movement. The cage may be threadedly mounted in a manner such that rotation of the cage causes its longitudinal movement relative to the tube, which in turn results in constriction of the tube. Desirably, I mount the cage on the choke section of the device and employ a structure of such design that successive 360 degree rotations adjust the tube successively to a plurality of predetermined choke conditions, as for short, medium and long range firing, respectively. Detent means may then be provided to releasably maintain the cage in a common angular position relative to the choke section for each of the choke conditions.

A further object of the invention is the provision of a novel muzzle device having firing characteristics similar to the device disclosed in Patent No. 2,447,205, issued to Edward Baden Powell on August 17, 1948. Specifically that patent shows a pattern control tube mounted at its forward end to an apertured cage positioned

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about the tube, the cage being secured to the muzzle end of a gun barrel in a manner such that the choke tube is maintained spaced from the barrel a distance not more than the total axial length of shot charge and following was normally designed for the gun. The advantages of the defined spaced relation were brought out in detail in that patent and will not be reiterated at this point. By the present invention, we provide a pattern control tube supported at its rearward end from the muzzle end of a gun barrel and spaced from the gun barrel a distance not longer than the above critical dimension.

This invention also discloses a novel adjustable diameter tube normally presenting an initially converging entrance bore section and then a diverging exit bore section and being resiliently deformable to present a true cylindrical exit bore.

The above and further features and objects of the invention will be better understood from the following detailed description of the typical embodiment illustrated in the accompanying drawings, in which:

Fig. 1 is a plan view showing the device applied to the muzzle end of a shot gun barrel;

Fig. 2 is a side elevation of the device shown in Fig. 1;

Fig. 3 is an enlarged fragmentary vertical section taken on line 3-3 of Fig. 1;

Fig. 4 is an enlarged detailed longitudinal section through the choke tube, showing the three positions to which each portion of the tube is inwardly deformable;

Fig. 5 is a bottom elevation of the choke tube section;

Fig. 6 is a side elevation of the choke tube section;

Fig. 7 is a transverse section taken on line 7-7 of Fig. 3; and

Fig. 8 is a transverse section taken on line 8-8 of Fig. 3.

Referring first to Figs. 1 through 3, the device is there illustrated as comprising a choke section, generally indicated at 10, applied to muzzle 11 of a shot gun, and a cage section 12, movably carried about the choke section.

The forward end of choke section 10 comprises choke tube 13 having a plurality of longitudinal slits 14 extending rearwardly from its forward end to provide a series of radially deflectible longitudinally extending portions 15 integrated at their rearward ends. Tube portions 15 converge slightly from their rear or shot entrance ends 16 to the longitudinal midpoint 17 of tube 13. Beyond that point, the tube portions are

flared slightly outwardly to provide a slightly diverging exit end extent. The tube is made of resilient material tending to restore the tube portions to the positions illustrated in Fig. 3, the portions however being resiliently deflectible inwardly to positions in which their forward ends form a true cylindrical exit tube. Annular groove 18, at the rearward termination of slits 14, is intended to assure deformability of the tube portions in the defined manner. Each tube portion presents at its forward end an outwardly facing transversely arcuate wedge surface 19 against which the cage section bears, as will be brought out later, to effect constriction of the tube.

Ribs 20, typically three in number and in the illustrated arrangement, extend rearwardly from tube 13, and are carried by tubular support 21, which in turn is secured to muzzle 11 of the gun, as by threaded connection 22. The ribs are preferably of such length that the gap distance D, between the gun muzzle and tube 13, is not longer than the total axial length of a shot charge and following wad normally designed for the gun. Thus, the charge and wad can never be wholly within the gap to permit the rapidly travelling combustion gases to pass around the charge and wad and enter the tube ahead of the charge. The importance of this critical spacial relationship in assuring most satisfactory pattern and range characteristics was brought out in Patent No. 2,447,205.

Cage section 12 includes tubular cage 23 having chevron shaped slots 24 and triangularly shaped slots 25 and 26 disposed across its top and sides to permit upward and lateral venting of the gases of combustion. The cage is disposed about the choke section and is annularly spaced from the choke tube at 40. Ring 27 presents an inwardly facing wedge surface 28 substantially complementary to surface 19 on the choke tube, and is carried by and threadedly engages the forward end of the cage at 29. Pin portion 30 of forward gun sight 31 is receivable within registering openings in the cage and ring to angularly interlock the two and prevent their relative rotation. Near its rearward end, the cage presents a reduced diameter bore 32 only slightly larger than the external diameter of the partial cylindrical surface formed by the curved outer surfaces 33 of ribs 20. The cage is rotatably carried upon support portion 21 of the tube section by virtue of threaded connection 34. This threaded connection is sufficiently loose to permit manual rotation of the cage relative to the tube section in order to allow adjustment of the tube diameter without the use of a tool. Spring pressed detent 35 and cooperating longitudinal groove 36 are provided in the rearward portion of the tube and cage sections, respectively, and register in the manner illustrated in Fig. 3, when sight 31 is in its upright position.

In use, the device is applied rigidly to muzzle 11 by threaded or other connection 22. This maintains adjustable tube 13 in substantial axial alignment with the gun barrel and spaced from the barrel the distance D which is preferably not more than the total axial length of a shot charge and following wad normally designed for the gun. By rotation of cage section 12 upon choke section 10, ring 27 may be moved longitudinally of the tube to vary the tube diameter. As will be understood, engagement of wedge surface 28 with surface 19 effects constriction of the tube upon rearward movement of the ring, while subsequent forward ring movement permits the re-

silient tube portions to move outwardly toward their normal condition. The device is adjustable, by successive 360 degree rotations of the cage section, to three choke conditions for short, medium, and long range firing, respectively. As an example, Fig. 4 illustrates the three conditions, giving optimum internal diameter measurements for use with a 10 gauge shot gun. Referring to Fig. 4, the three degrees of choke are there designated by the reference numerals 1, 2 and 3. In all conditions, the rearward integral end of the choke tube measures .790 inch. In condition Number 1, the entrance or rearward end of the tube converges to a diameter of .749 inch at the approximate longitudinal center 17 of the tube. Beyond that point, each tube portion flares slightly outwardly, and the tube thus presents a diverging exit portion whose end diameter is .790 inch. By rotating the cage section 360 degrees, or a complete revolution, in a clockwise direction as seen from its exit end, the engaging wedge surfaces constrict the adjustable tube to condition 2 of Fig. 4. In that condition, the bore converges to .724 inch and then diverges to .741 inch. Another revolution of the cage section further constricts the tube to condition 3, in which the bore initially converges to .708 inch at point 17 and then presents a constant diameter true cylindrical exit bore measuring .708 inch to the forward end of the tube. Detent 35 indicates by a clock the exact angular position for the cage in each condition, and releasably retains the cage in that position.

Upon firing the gun, the gap between the gun barrel and tube 13 permits escape of the explosion gases from behind a shot charge as soon as the charge and its following wad leave the barrel. Some of the gases are, of course, vented from the defined gap through the adjacent rear slots 24 and 25 of the cage, and thus directly to the atmosphere. The rest of the gases travel forwardly into annular space 40 and then outwardly to the atmosphere through the slots in the forward portion of the cage.

Since there are escape slots in the top of the cage but not the bottom, the upwardly escaping gases tend to urge the muzzle downwardly to prevent muzzle jump. Also, impingement of the rapidly travelling gases against the rear edge 41 of the choke tube and the various forward faces 42 of the escape slots tends to move the muzzle device and gun forward to compensate for the normal recoil of the gun.

I claim:

1. A shot gun compensator and variable choke comprising a choke tube adapted to extend forwardly at the forward end of a shot gun barrel substantially in axial alinement therewith, said tube having a forward constrictable portion containing longitudinal slits extending rearwardly from its forward end, said forward slit portion of the tube including a rear section containing a forwardly and gradually tapering bore and a forward section containing a forwardly and gradually flaring bore, said tube containing aperture means to the rear of said slits through which the gases of combustion are vented from the tube upon firing, a tubular cage disposed about said choke tube, said cage and tube being constructed and arranged to provide a passage extending longitudinally therebetween and in open communication with said aperture means in the tube, outlet means in the wall of said cage leading exteriorly from said passage to the atmosphere, and means for variably constricting the forward slit

portion of the tube, said tube having hinge means near the rear of said slits at which the tube flexes upon said constriction.

2. A shot gun compensator and variable choke comprising a choke tube adapted to extend forwardly at the forward end of a shot gun barrel substantially in axial alinement therewith, said tube having a forward constrictable portion containing longitudinal slits extending rearwardly from its forward end, said forward slit portion of the tube including a rear section containing a forwardly and gradually tapering bore and a forward section containing a forwardly and gradually flaring bore, said tube containing aperture means to the rear of said slits through which the gases of combustion are vented from the tube upon firing, a tubular cage disposed about said choke tube, said cage and tube being constructed and arranged to provide a passage extending longitudinally therebetween and in open communication with said aperture means in the tube, outlet means in the wall of said cage leading exteriorly from said passage to the atmosphere, and rotatable wedge means engaged with the forward slit portion of the tube and adjustable to variably constrict the tube, the wall of said tube being locally reduced in thickness at a location near the rear of said slits so that the maximum flexure of the tube upon said constriction occurs at that location.

3. A shot gun compensator and variable choke comprising a choke tube adapted to extend forwardly at the forward end of a shot gun barrel substantially in axial alinement therewith, said tube having a forward constrictable portion containing longitudinal slits extending rearwardly from its forward end, said forward slit portion of the tube including a rear section containing a forwardly and gradually tapering bore and a forward section containing a forwardly and gradually flaring bore, said tube containing aperture means to the rear of said slits through which the gases of combustion are vented from the tube upon firing, said aperture means extending longitudinally of the tube a distance not greater than the total axial length of the shot column and following was normally designed for the gun, a tubular cage disposed about said choke tube, said cage and tube being constructed and arranged to provide a passage extending longitudinally therebetween and in open communication with said aperture means in the tube, outlet means in the wall of said cage leading exteriorly from said passage to the atmosphere, and rotatable wedge means engaged with the forward slit portion of the tube and adjustable to variably constrict the tube, the wall of said tube being locally reduced in thickness at a location near the rear of said slits so that the maximum flexure of the tube upon said constriction occurs at that location.

4. A shot gun compensator and variable choke comprising a choke tube having a rear mounting portion attachable to the muzzle end of a gun substantially in axial alinement therewith, said tube having a forward constrictable portion containing longitudinal slits extending rearwardly from its forward end, said forward slit portion of the tube including a rear section containing a forwardly and gradually tapering bore and a forward section containing a forwardly and gradually flaring bore, said tube containing aperture means to the rear of said slits and forward of said

rear mounting portion and through which the gases of combustion are vented from the tube upon firing, a tubular cage disposed about said choke tube, means connecting the rear portion of said cage to the tube rearwardly of said aperture means, said cage and tube being constructed and arranged to provide a passage extending longitudinally therebetween and in open communication with said aperture means in the tube, outlet means in the wall of said cage leading exteriorly from said passage to the atmosphere, and rotatable wedge means carried by the forward end of the cage and engaged with the forward slit portion of the tube for variably constricting the tube, the wall of said tube being locally reduced in thickness at a location near the rear of said slits so that the maximum flexure of the tube upon said constriction occurs at that location.

5. A shot gun compensator and variable choke comprising a choke tube adapted to extend forwardly at the forward end of a shot gun barrel substantially in axial alinement therewith, said tube having a forward constrictable portion containing longitudinal slits extending rearwardly from its forward end, said forward slit portion of the tube including a rear section containing a forwardly and gradually tapering bore and a forward section containing a forwardly and gradually flaring bore, said tube containing aperture means to the rear of said slits through which the gases of combustion are vented from the tube upon firing, a tubular cage disposed about said tube in radially spaced relation thereto to form between the cage and tube a passage in open communication with said aperture means, a threaded joint rotatably connecting the rear portion of the cage to the tube rearwardly of said aperture means, said cage being imperforate opposite said aperture means and having gas outlet means in its wall opposite the slit portion of the tube leading exteriorly from said passage to the atmosphere, and a wedge ring carried by the forward end of the cage for rotation therewith and engaging the forward end of the tube to variably constrict the slit portion of the tube in accordance with said rotation, the wall of said tube containing an annular external groove at the rear ends of said slits and forwardly of said aperture means to form a locally reduced thickness wall portion at which the tube flexes upon said constriction.

EDWARD BADEN POWELL.

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