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(54) Adjustable sound suppressor for weapon.

(57) A sleeve 30 is slidably longitudinally of a can 14, on a weapon 12, containing sound suppressing means 10, between a first position retracted onto the can and a second position extending forwardly from the can with only adjacent ends lapping, to enhance sound suppressing action when the sleeve 30 is moved to the second extended position. A longitudinally extending slot 80 in the sleeve, with laterally extending notches 82, and a stop 84 disposed in the slot 80 to limit movement of the sleeve 30 on the can 14. A knob with lock means to secure the stop in a selected notch of the slot.

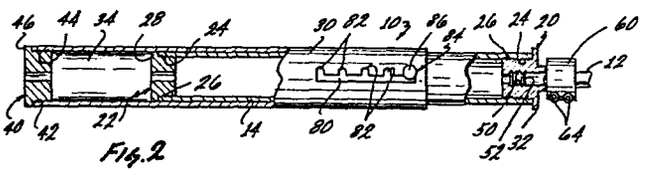

Fig.2

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ADJUSTABLE SOUND SUPPRESSOR FOR WEAPON

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My invention relates to means for increasing sound suppression in a sound suppressor when desired by increasing its length and to reduce the length of the suppressor on the weapon when desired by retraction.

One desirable feature in a suppressor is to maximize sound suppression and another is to minimize bulk or length of the suppressor for easier handling. It is an objective of my invention to achieve both features by means to change the length of the suppressor. Further objectives include providing a structure of simple, safe and reliable action, to devise means for operation even in the dark, to provide means to lock the structure in selected position, and to devise a low cost device and one requiring minimum maintenance.

My invention will be best understood, together with additional objectives and advantages thereof, from the following description, read with reference to the accompanying drawings, in which

FIGURE 1 is a longitudinal view, partly in section, of a specific embodiment of my new adjustable sound suppressor for a weapon;

FIGURE 2 is another longitudinal view, partly in section;

FIGURE 3 is an exploded perspective view;

FIGURE 4 is a view, partly in section, taken on line 4-4 of Figure 1; and

FIGURE 5 is a view, partly in section, taken on line 5-5 of Figure 1.

My concepts, etc., of an adjustable sound suppressor can be summarized in part as follows:

1. Provide a telescoping sleeve on a sound suppressor can that may be extended to provide an expansion chamber forward of the can. The forward chamber can accommodate the precursor wave, i.e., the compressed air volume in front of a projectile.

Depending on the speed of the projectile relative to the speed of sound, this can be a shock wave. In other words, the compressed air may expand or displace to the side thereby permitting the projectile to exit before the precursor wave, instead of the precursor wave having to exit from the sound suppressor before the projectile. By exiting after the projectile, the wave or volume of compressed air may exit over a longer duration of time and therefore exit at a considerably lower sound level.

2. When the sleeve is extended, a large secondary expansion chamber is provided in the sleeve forward of the end of the can. The extra chamber allows for further expansion of gases, in addition to the expansion of gases that occur in the can. In this way, gases not only expand more before exiting from the suppressor but also the gases escape over a longer duration of time and produce a lower sound level.

3. The sleeve concept, by its collapsible nature and its efficiency, makes it possible to reduce the overall size of a sound suppressor, i.e., for a given amount of sound suppression, the collapsed suppressor will have less length or volume than the normal non-collapsible suppressor.

4. The sleeve concept lends itself to basically every known suppressor type.

5. Preliminary tests of a prototype have shown 68% greater sound suppression by adding the sleeve to the can of an existing type of sound suppressor.

It should be understood that the preceding discussion of the operation of compressed air, etc., involved in the addition of an extended sleeve to a sound suppressor, as shown and described, is theoretical. The important thing is the results obtained, which are not theoretical, whether or not

the technical explanation of operation is correct or complete. As far as is known, the 68% improvement is representative of what can be achieved with my invention, whether or not my description of why or how it works is completely accurate technically or scientifically. When sleeves of various lengths, etc., are added to other suppressors, possibly greater or less sound reductions will be achieved, but I have demonstrated that results can be quite significant.

I will now specifically describe the suppressor 10 shown in the drawings, which is added to weapon 12 symbolized by its barrel. A sound suppressor can 14 has sound suppressing means 16 indicated by a general block. The sound suppression means 16 can be of any conventional or suitable type which will commonly involve baffles.

Can 14 has a bored projectile entrance plug 20 and a bored projectile exit plug 22 shown as threadedly secured in place by threads 24 on the interior of the can and by threads 26 on the exterior of the plugs. The flange 28 on exit plug 22 should be small enough to fit within sleeve 30, whereas the flange 32 on entrance plug 24 may be of sufficient diameter to lap the ends of sleeve 30 when the sleeve is retracted although other stop means for the retraction of sleeve 30 are provided.

Sleeve 30 is slidably mounted on can 14 and is movable between a first fully retracted position and a second fully extended position with only the adjacent ends of sleeve and can lapping. It will be observed that when sleeve 30 is fully extended it forms another secondary sound suppressing expansion chamber 34 in addition to the chamber of can 14. The chamber 34 is closed by a bored projectile exit plug 40 secured in place by threads 42 on plug 40 and by threads 44 on the inside of sleeve 30. Plug 40 has a flange 46.

The sound suppressing action of sleeve chamber 34 presumably has something to do with providing expansion room for gas exiting with or ahead of a projectile. As above indicated, the correct analysis of the reason for its effectiveness is not necessarily known but its effectiveness has been measured at 68% increase in sound suppression in one model.

The sound suppressor 10 is suitably attached to the barrel 12 of a weapon. In the attaching structure shown, it is part of can entrance plug 20 and includes the threaded bore 50 of plug 20 which engages with threads 52 on barrel 12. To secure suppressor 10 from becoming unthreaded from barrel 12, the rear portion or boss 54 of plug 20 is diametrically split at 56. Boss 54 has external threads 58 and a split nut 60 with internal threads 62 engages threads 58. Set screws 64 extend through openings 66 and are threaded into openings 68 on opposite sides of the split 70 of nut 60, whereby screws 64 can be tightened to compress boss 54 on barrel 12 to lock plug 20 from becoming unthreaded from the barrel. Surface 72 inside boss 54 is not threaded but may be scored in the process of making threads 50 whereby surface 72 will have additional functional gripping on barrel 12.

Sleeve 30 has a longitudinal slot 80 and a series of notches 82 extending laterally therefrom. A stop 84 attached to can 14 extends into slot 80. When stop 84 is at one end of slot 80, sleeve 30 is fully extended, and when stop 84 is at the other end of slot 80, sleeve is fully retracted. Notches 82 represent other selected positions which, along with the extreme ends of slot 80, may be sensed tactilely without looking or even in the dark, so that positioning of sleeve 30 on can 14 does not depend on slight or on having time to look, but instead can be done rapidly by sense of feeling

as the user gains experience with use of suppresor 10.

Stop 84 is a bolt screwed into can 14 and having a knurled head 86 and a locking washer 88. Thus, stop 84 can be secured in adjusted position in slot 80 or in one of the notches 82 by manually tightening the bolt by means of knurled head 86.

Having thus described my invention, I do not wish to be understood as limiting myself to the precise structure shown. Instead I wish to cover those modifications thereof which will occur to those skilled in the art upon learning of my invention and which properly fall within the scope of my invention.

CLAIMS :

1. The improvement in a sound suppressor extending forwardly from the barrel of a weapon, comprising:

(a) said suppressor having a generally cylindrical shaped can having interior sound suppressing means,

(b) an entrance end wall on said can having a bore and means securing said can to said barrel of said weapon, and

(c) a manually movable tubular sleeve fitted on said can having an exit wall with a bore, said sleeve being slidable longitudinally of said can by manual adjustment between a first position retracted onto said can with said exit wall adjacent to said can and a second position extending forwardly from said can with only adjacent ends lapping and with said exit wall widely spaced from said can whereby the sound suppressing action of said suppressor is enhanced by lengthening thereof as said sleeve is moved from said first position toward said second position.

2. The subject matter of Claim 1 in which there is securing means securing said sleeve in selected position on said can.

3. The subject matter of Claim 2 in which said securing means includes a slot in said sleeve extending longitudinally of said suppressor and a stop extending from said can into said slot thereby limiting movement of said sleeve relative to said can.

4. The subject matter of Claim 3 in which stop is a threaded body with a manually operable knob with lock means whereby said stop can be tightened to lock said sleeve in position on said can.

5. The subject matter of Claim 4 in which said sleeve has a plurality of notches extending laterally from said slot in which said stop can be selectively positioned to index extension of said sleeve relative to said can and for locking of said stop in a selected position.

6. The subject matter of Claim 1 in which there is a bored exit end plug in the end of said can away

from said barrel and said exit end wall of said sleeve is a bored exit end plug in the end of said sleeve farthest from said barrel.

7. The subject matter of Claim 6 in which said exit end plug of said can has a flange fitting the interior of said sleeve and in which said entrance end wall on said can is a bored entrance end plug having a flange which said sleeve abuts in said first position of said sleeve, and in which said plugs are threadedly secured in place in said can and sleeve.

8. The improvement in a sound suppressor extending forwardly from the barrel of a weapon, comprising:

(a) said suppressor having a can with interior sound suppressing means,

(b) means securing said can to said barrel of said weapon, and

(c) a manually movable suppressing extension fitted on said can and means supporting said extension to move generally longitudinally of said can by manual adjustment between a first position telescopically relative to said can and a second position telescopically extending forwardly from said can whereby the sound suppressing action of said suppressor is enhanced by lengthening thereof as said sound suppressing extension is moved from said first position toward said second position.

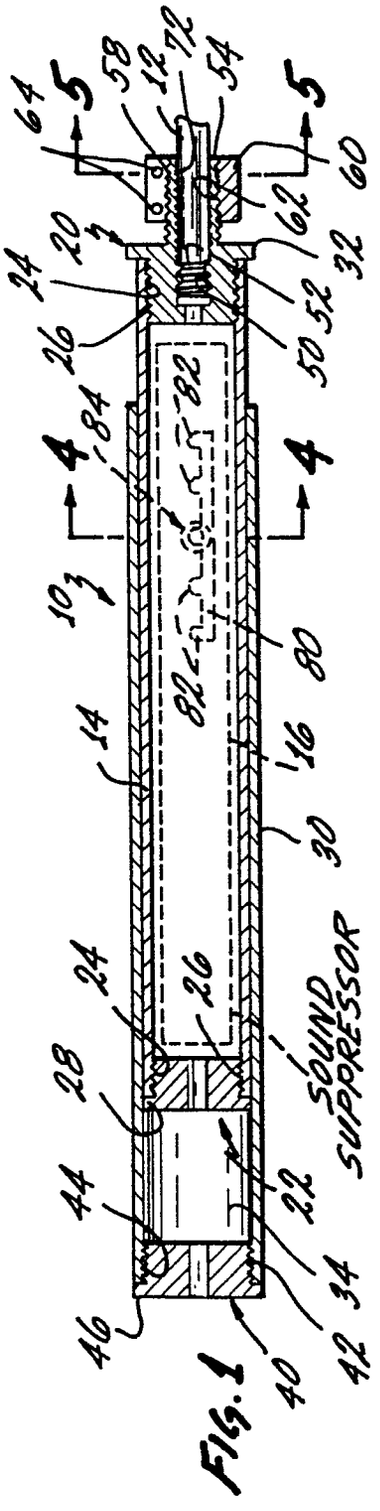

Fig. 1

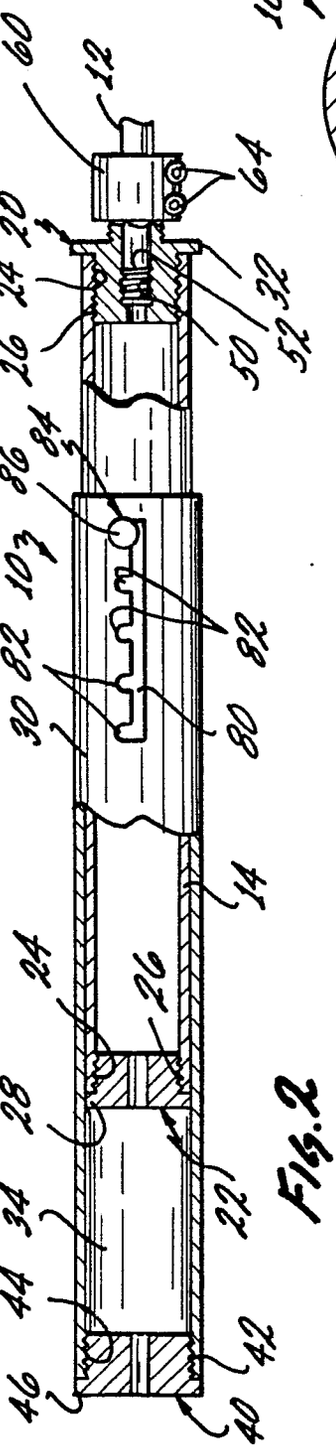

Fig. 2

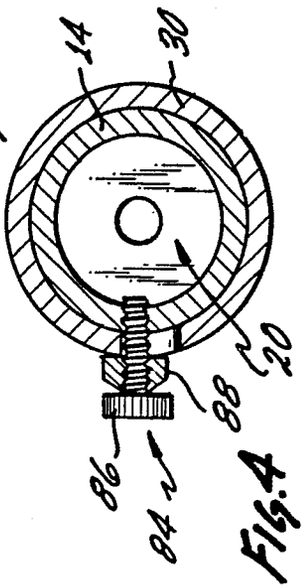

Fig. 4

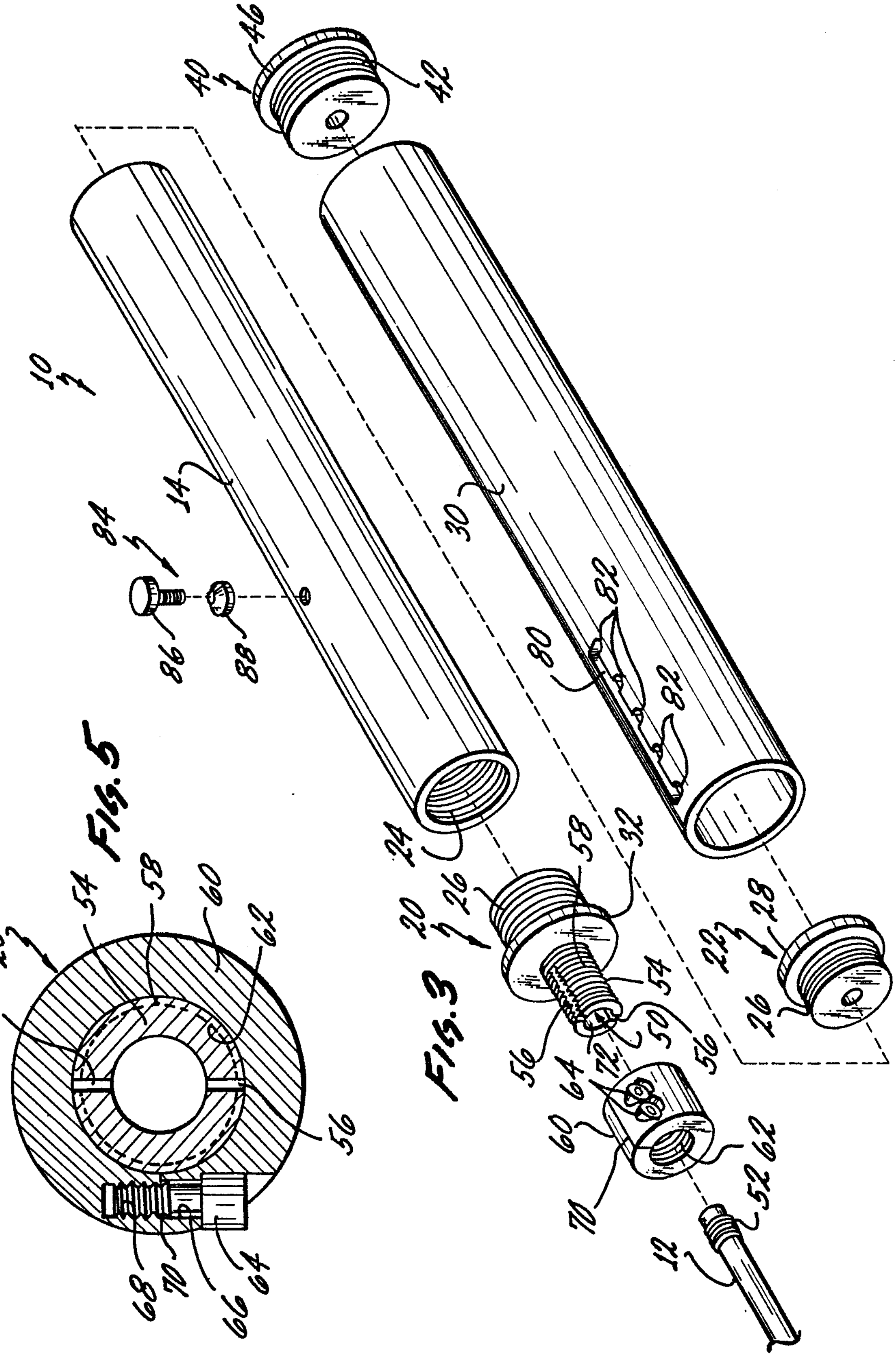

Fig. 3

Fig. 5

European Patent Office

EUROPEAN SEARCH REPORT

Application number

EP 82 30 2242

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. ³)
X	US-A-4 203 347 (PINSON et al.) *The whole document*	1,8	F 41 G 21/18
A	DE-C- 214 226 (KRISTANDT)		

TECHNICAL FIELDS SEARCHED (Int. Cl. ³)

F 41 C
F 41 F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	05-01-1983	WETZEL H.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

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