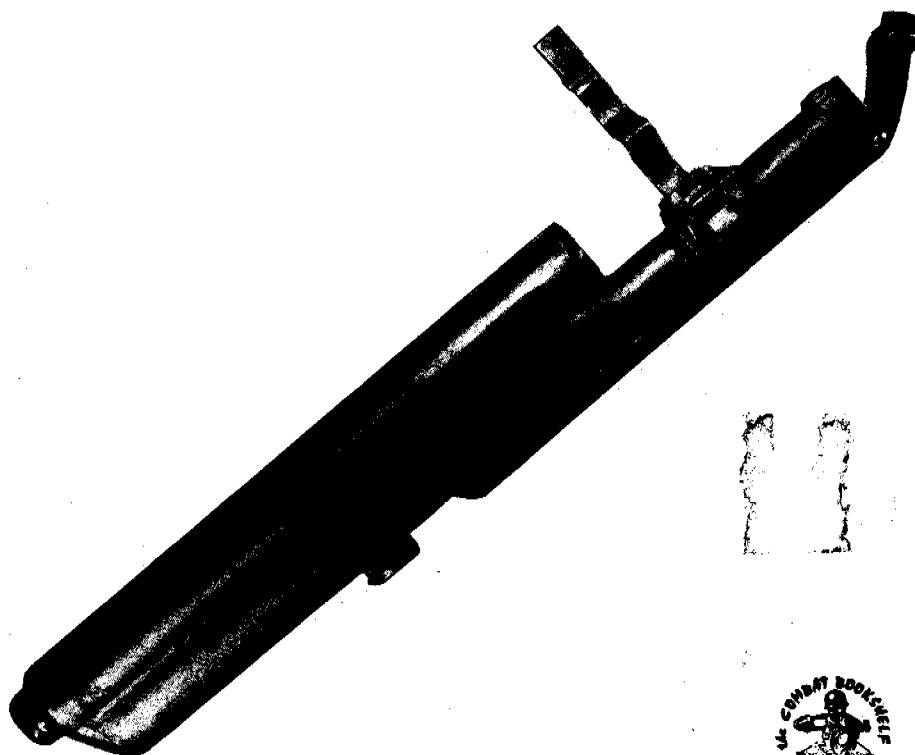


# FIREARM

# SILENCERS

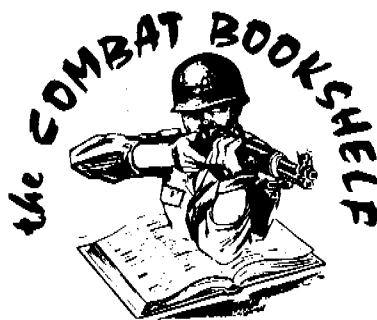


# FIREARM SILENCERS

Volume 1, US

by  
Donald B. McLean

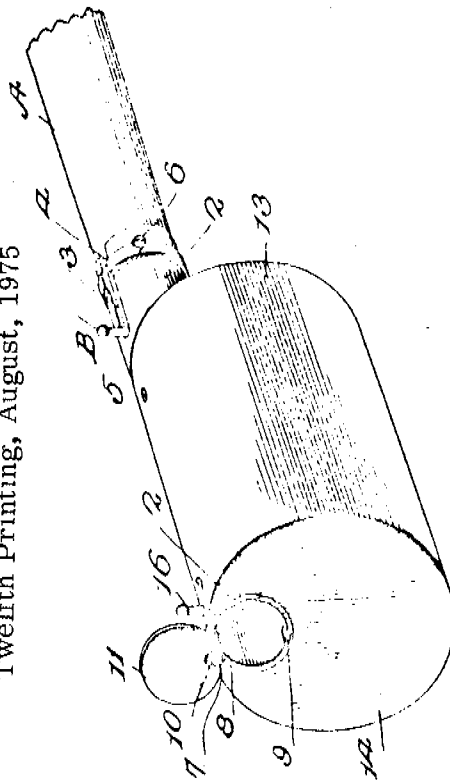
Detailing the history,  
design, and development  
of firearm silencers in the USA



NORMOUNT TECHNICAL PUBLICATIONS  
Wickenburg, Arizona 85358

Copyright © 1968  
by Donald B. McLean

- First Printing, April, 1968
- Second Printing, June, 1968
- Third Printing, December, 1968
- Fourth Printing, August, 1969
- Fifth Printing, January, 1970
- Sixth Printing, May, 1970
- Seventh Printing, October, 1970
- Eighth Printing, February, 1971
- Ninth Printing, October, 1971
- Tenth Printing, May, 1973
- Eleventh Printing, December, 1974
- Twelfth Printing, August, 1975



INTERNATIONAL STANDARD BOOK NUMBER: 0-87947-005-4  
Library of Congress Catalog Card Number  
68-24094

Printed in the U.S.A.

## TABLE OF CONTENTS:

	page:
Contents-----	3
Special Notice-----	7
Introduction-----	9
R. A. Moore-----	11
Hiram P. Maxin-----	18
O.S.S. High Standard HD Military-----	29
O.S.S. Colt Woodsman-----	34
Hand Firing Device Mark I-----	36
O.S.S. M1A1 Thompson-----	38
O.S.S. M3 Submachine Gun-----	39
Chicom Model 37 Submachine Gun-----	42
O.S.S. .30 Carbine-----	44
Parker-Hale Silencers-----	47
Seth T. Jones-----	51
King Bayonet-Silencer-----	54
J. De Vries-----	56
Harry Craven-----	58
E. W. Thompson-----	63
Andy C. Shipley-----	66
John Brown-----	69
Hopkins and Allen Noiseless-----	77
W.E. Westfall-----	78
C. H. Kenney-----	82
E. Thurler-----	84
J. H. Stinson-----	86
A. Fiala-----	88
Geo. P. Riggs-----	90
Herbert P. Moore-----	92
G. F. Childress-----	94
L. E. Wurtzebach-----	96
O. J. Bailey-----	98
R. M. Towson-----	100
S. Bernat-----	102
B. Walker-----	104
Z. Wilman-----	106
Andy Bauer-----	110
C. Caulkins-----	112
William J. Jarrett-----	117
Improvised Silencers-----	121
Legal "Silencers"-----	122



# SILENCERS

PATTERNS &

PRINCIPLES



THE FRANKFORD ARSENAL REPORT, AUG.'68

# SILENCERS

## Patterns and Principles



**FRANKFORD ARSENAL REPORT**

**R-1896 Aug.'68**

by

**Leonard W. Skochko - Harry A. Greveris**

Originally published by the Ammunition Development & Engineering Laboratory, Frankford Arsenal, August, 1968. Edited and revised by Normount Technical Publications, Box 211, Forest Grove, Oregon, 97116, U.S.A., Oct.'71.

**Normount Technical Publications**

**Wickenburg, Arizona 85358**



**TABLE OF CONTENTS**

	<u>Page No.</u>
INTRODUCTION. . . . .	1
SILENCER PRINCIPLES. . . . .	2
DESCRIPTION AND EVALUATIONS OF SILENCERS TESTED . . . . .	7
Caliber . 22 Hi-standard Pistol/French Silencer. . . . .	10
Caliber . 22 Silenced Hi-standard Pistol . . . . .	16
Caliber . 22 Silenced AAI Experimental Test Fixture . . . . .	23
Caliber . 22 Hi-standard Pistol/FA Silencer . . . . .	31
Caliber . 30 M1903 Rifle/Maxim Silencer . . . . .	37
Caliber . 30 Silenced M1 Carbine. . . . .	47
Caliber . 32 Silenced Sleeve Gun . . . . .	52
Caliber . 32 Silenced Welrod Pistol. . . . .	58
9 mm Silenced Welrod Pistol . . . . .	66
9 mm Silenced Sten Submachine Gun . . . . .	72
Silenced Sten Barrel, Type I. . . . .	76
Silenced Sten Barrel, Type II . . . . .	82
9 mm P38 Walther Pistol/AAI Silencer. . . . .	88
9 mm Walther MPK Submachine Gun/West German Silencer. . . . .	94
Caliber . 45 Silenced M3 Submachine Gun . . . . .	100
Bell Laboratories Silenced Barrel . . . . .	100
AMF Silenced Barrel . . . . .	112
CONCLUSIONS . . . . .	119
RECOMMENDATIONS . . . . .	123
APPENDIX A - Ballistic Crack Field . . . . .	125

APPENDIX B - Subsonic Projectile Flight Noise. . . . . 128

APPENDIX C - Gun Muzzle Blast . . . . . 132

APPENDIX D - Gun Silencers . . . . . 145

APPENDIX E - Silencer Techniques & Representative Patents . . . . . 158

APPENDIX F - Relative Loudness of Discreet Sound Pulses . . . . . 189

BIBLIOGRAPHY. . . . . 193

LIST OF PATENTS. . . . . 198

List of Tables

Table

I. Caliber .22 Hi-standard Pistol/French Silencer . . . . . 13

II. Caliber .22 Silenced Hi-standard Pistol . . . . . 22

III. Caliber .22 Silenced AAI Experimental Test Fixture . . . . . 28

IV. Caliber .22 Hi-standard Pistol/FA Silencer . . . . . 35

V. Caliber .30 M1903 Rifle/Maxim Silencer . . . . . 42

VI. Caliber .30 Silenced M1 Carbine. . . . . 50

VII. Caliber .32 Silenced Sleeve Gun . . . . . 57

VIII. Caliber .32 Silenced Welrod Pistol . . . . . 63

IX.	9 mm Silenced Welrod Pistol . . . . .	69
X.	9 mm Silenced Sten Submachine Gun, Type I Barrel . . . . .	79
XI.	9 mm Silenced Sten Submachine Gun, Type II Barrel. . . . .	86
XII.	9 mm P38 Walther Pistol/AAI Silencer. . .	91
XIII.	9 mm MPK Walther Submachine Gun/West German Silencer . . . . .	98
XIV.	Caliber .45 M3 Submachine Gun/Bell Laboratories Silenced Barrel. . . . .	109
XV.	Caliber .45 M3 Submachine Gun/AMF Silenced Barrel. . . . .	117
XVI.	Physical, Functional, and Acoustical Parameters of Silenced and Unsilenced Small Arms Weapons . . . . .	121

List of Illustrations

Figure

1.	Cross section, Caliber .22 Hi-standard Pistol/French Silencer . . . . .	11
2.	Caliber .22 Hi-standard Pistol/French Silencer . . . . .	12
3.	Sound Pressure-Time History, five meters to side, Caliber .22 Hi-standard Pistol (Unsilenced), Using Long Rifle Cartridge. . . .	14
4.	Sound Pressure-Time History, five meters to side, Caliber .22 Hi-standard Pistol (Unsilenced), Using Long Rifle Cartridge. . . .	15



5.	Sound Pressure-Time History, five meters to side, Caliber .22 Hi-standard Pistol/ French Silencer, Using Long Rifle Cartridge . . . . .	17
6.	Sound Pressure-Time History, five meters to side, Caliber .22 Hi-standard Pistol (Un-silenced), Using Short Cartridge (29-gr projectile; velocity, 1050 fps; peak pressure, 16000 psi). . . . .	18
7.	Cross section, Caliber .22 Silenced Hi-standard Pistol . . . . .	19
8.	Caliber .22 Silenced Hi-standard Pistol . . . . .	20
9.	Caliber .22 Silenced Hi-standard Pistol, Disassembled. . . . .	21
10.	Sound Pressure-Time History, five meters to side, Caliber .22 Silenced Hi-standard Pistol, Using Long Rifle Cartridge . . . . .	24
11.	Cross section, Caliber .22 Silenced AAI Experimental Test Fixture . . . . .	25
12.	Caliber .22 Silenced AAI Experimental Test Fixture . . . . .	26
13.	Caliber .22 Silenced AAI Experimental Test Fixture, Disassembled . . . . .	27
14.	Sound Pressure-Time History, five meters to side, Caliber .22 Silenced AAI Experimental Test Fixture, Using Long Rifle Cartridge . . . . .	30
15.	Cross section, Caliber .22 Hi-standard Pistol/FA Silencer . . . . .	32
16.	Caliber .22 Hi-standard Pistol/FA Silencer. . . . .	33
17.	Caliber .22 Hi-standard Pistol and FA Silencer (with Tape Removed), Disassembled. . . . .	34

18.	Sound Pressure-Time History, five meters to side, Caliber .22 Hi-standard Pistol/FA Silencer, Using Long Rifle Cartridge .	36
19.	Cross Section, Caliber .30 M1903 Rifle/Maxim Silencer . . . . .	38
20.	Caliber .30 M1903 Rifle/Maxim Silencer .	39
21.	Maxim Silencer for Caliber .30 M1903 Rifle. . . . .	40
22.	Maxim Silencer for Caliber .30 M1903 Rifle, Disassembled . . . . .	41
23.	Sound Pressure-Time History, five meters to side, Caliber .30 M1903 Rifle (Unsilenced) Using Subsonic Cartridge. . . . .	44
24.	Sound Pressure-Time History, five meters to side, Caliber .30 M1903 Rifle/Maxim Silencer, Using Subsonic Cartridge . . .	45
25.	Sound Pressure-Time History, five meters to side, Caliber .30 M1903 Rifle/Maxim Silencer, Using Subsonic Cartridge . . .	46
26.	Cross section, Caliber .30 Silenced MI Carbine . . . . .	48
27.	Caliber .30 Silenced MI Carbine. . . . .	49
28.	Sound Pressure-Time History, five meters to side, Caliber .30 Silenced MI Carbine.	51
29.	Cross section, Caliber .32 Silenced Sleeve Gun . . . . .	53
30.	Caliber .32 Silenced Sleeve Gun, side view.	54
31.	Caliber .32 Silenced Sleeve Gun, top view .	55

32.	Caliber .32 Silenced Sleeve Gun, Dis-assembled . . . . .	56
33.	Sound Pressure-Time History, five meters to side, Caliber .32 Silenced Sleeve Gun with Old Rubber Baffles . . . . .	59
34.	Sound Pressure-Time History, five meters to side, Caliber .32 Silenced Sleeve Gun with New Rubber Baffles . . . . .	60
35.	Cross section, Caliber .32 Silenced Welrod Pistol . . . . .	61
36.	Caliber .32 Silenced Welrod Pistol . . . . .	62
37.	Sound Pressure-Time History, five meters to side, Caliber .32 Silenced Welrod Pistol . . . . .	65
38.	Cross section, 9 mm Silenced Welrod Pistol . . . . .	67
39.	9 mm Silenced Welrod Pistol . . . . .	68
40.	Sound Pressure-Time History, five meters to side, 9 mm Silenced Welrod Pistol (less Silencer Section), Using Reduced Charge Round . . . . .	70
41.	Sound Pressure-Time History, five meters to side, 9 mm Silenced Welrod Pistol with Old Rubber Baffles, Using Reduced Charge Round . . . . .	71
42.	Sound Pressure-Time History, five meters to side, 9 mm Silenced Welrod Pistol with New Rubber Baffles, Using Reduced Charge Round . . . . .	73
43.	Sound Pressure-Time History, five meters to side, 9 mm Silenced Welrod Pistol with New Rubber Baffles, Using Standard NATO Round (Projectile Muzzle Velocity, 930 fps) . . . . .	74

44.	9 mm Silenced Sten Submachine Gun, Showing Type I and Type II Silenced Barrels . . . . .	75
45.	Sound Pressure-Time History, five meters to side, 9 mm Silenced Sten Submachine Gun Bolt Slap, without Cartridge . . . . .	77
46.	Cross section, 9 mm Silenced Sten Submachine Gun Barrel (Type I) . . . . .	78
47.	Assembly, 9 mm Silenced Sten Submachine Gun Barrel (Type I) in Test Fixture . . . . .	80
48.	Disassembly, 9 mm Silenced Sten Submachine Gun Barrel (Type I) and Test Fixture . . . . .	81
49.	Sound Pressure-Time History, five meters to side, 9 mm Silenced Sten Submachine Gun Barrel (Type I) in Test Fixture. . . . .	83
50.	Cross section, 9 mm Silenced Sten Submachine Gun Barrel (Type II) . . . . .	85
51.	Sound Pressure-Time History, five meters to side, 9 mm Silenced Sten Submachine Gun Barrel (Type II) in Test Fixture . . . . .	87
52.	Cross section, 9 mm P38 Walther Pistol/AAI Silencer . . . . .	89
53.	9 mm P38 Walther Pistol/AAI Silencer . . . . .	90
54.	Sound Pressure-Time History, ten meters to side, 9 mm P38 Walther Pistol without Silencer, Using Subsonic Cartridge. . . . .	92
55.	Sound Pressure-Time History, ten meters to side, 9 mm P38 Walther Pistol/AAI Silencer, Using Subsonic Cartridge. . . . .	93

56.	Cross section, 9 mm MPK Walther Subma- chine Gun and West German Silencer . . . . .	95
57.	9 mm MPK Walther Submachine Gun and West German Silencer . . . . .	96
58.	9 mm MPK Walther Submachine Gun/ West German Silencer . . . . .	97
59.	Sound Pressure-Time History, five meters to side, 9 mm MPK Walther Submachine Gun without Silencer, Using Subsonic car- tridge . . . . .	99
60.	Sound Pressure-Time History, five meters to side, Bolt Slap, 9 mm MPK Walther Submachine Gun/West German Silencer, without Cartridge . . . . .	101
61.	Sound Pressure-Time History, five meters to side, 9 mm MPK Walther Submachine Gun/West German Silencer, Using Subsonic Cartridge . . . . .	102
62.	Sound Pressure-Time History, five meters to side, 9 mm MPK Walther Submachine Gun/West German Silencer, Using Sub- sonic Cartridge and with Weapon and Si- lencer Wrapped with Attenuating Mate- rial . . . . .	103
63.	Caliber .45 M3 Submachine Gun . . . . .	104
64.	Cross section, Caliber .45 Bell Labor- atories Silenced M3 Submachine Gun Barrel . . . . .	106
65.	Caliber .45 M3 Submachine Gun/Bell Laboratories Silenced Barrel . . . . .	107

66.	Disassembly, Caliber .45 Bell Laboratories Silenced M3 Submachine Gun Barrel.	108
67.	Sound Pressure-Time History, ten meters to side, Caliber .45 Submachine Gun Barrel (Standard, 7.5 inches long) in Test Fixture . . . . .	110
68.	Sound Pressure-Time History, 4.6 meters to side, Caliber .45 Bell Laboratories Silenced M3 Submachine Gun Barrel in Test Fixture . . . . .	111
69.	Cross Section, Caliber .45 AMF Silenced M3 Submachine Gun Barrel. . . . .	113
70.	Caliber .45 M3 Submachine Gun/AMF Silenced Barrel. . . . .	114
71.	Assembly, Caliber .45 AMF Silenced M3 Submachine Gun Barrel and Test Fixture .	115
72.	Disassembly, Caliber .45 AMF Silenced M3 Submachine Gun Barrel and Test Fixture . . . . .	116
73.	Sound Pressure-Time History, ten meters to side, Caliber .45 M3 Submachine Gun Barrel (5.6 in. long), without Silencer, in Test Fixture . . . . .	118
74.	Sound Pressure-Time History, five meters to side, Caliber .45 AMF Silenced M3 Submachine Gun Barrel in Test Fixture. . . .	120