

Sportsman M/710 Bolt Action Rifle

Design Concept Review I

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February 20, 1998

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Sportsman Model 710

Concept Review Agenda

- ☐ Review Program Objectives, Design Goals, Status and Schedule ----- Danny Diaz
- ☐ Key Design Aspects ----- Derek Watkins
- ☐ Nontraditional Receiver ----- Derek Watkins
- ☐ Traditional Receiver ----- Derek Watkins
- ☐ Collect and Record Input ----- Team
- ☐ Review Conclusions ----- Danny Diaz

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Sportsman Model 710 Bolt Action Rifle

Lead Engineers: D. Watkins; J. Ronkainen 241095

Project Description:

A bolt action rifle accommodating short & long action calibers; standard barrel lengths; synthetic & wood stocks; magazine box, and a reasonable grade trigger; accepts scope bases offered with optional adjustable sights.

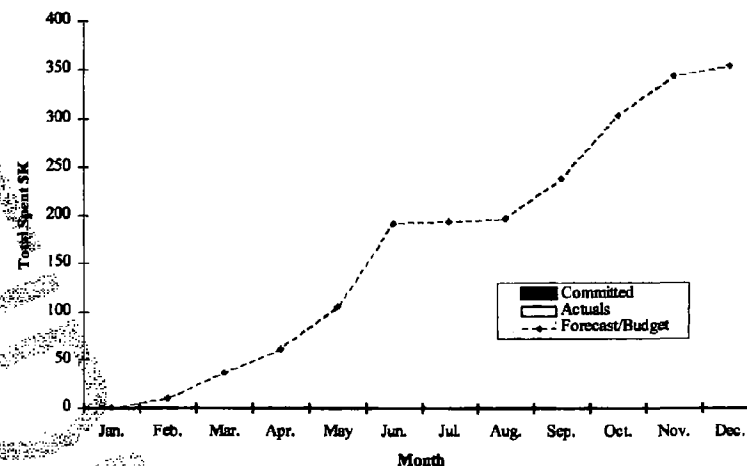
Risk Assessment:

Medium: Due to aggressive cost and process requirements.

Project Objectives:

- Reduce cost to manufacture and manufacturing lead time.
- Above average Gross profit margin (45%).
- Offered as an entry level bolt action rifle while elevating the M/700.
- Compete directly with the Savage (111FC) similar offerings.

1998 Spending



Project Milestones/Schedule:

ID	Task Name	97				1998				1999				200		
		3	4	1	2	3	4	1	2	3	4	1	2	3		
1	Sportsman Model 710 Bolt Actio															
2	Develop First Pass Schedule															
3	Project Definition Phase															
54	Preliminary Design Phase															
18	Build EE Test - Prototypes (12															
19	Final Design:															
23	Build DAT Prototypes (40); Te															
24	Design Transmittal															
25	Production Support															

Total Project Cost: Expense: \$1,105K Capital:\$K

Project Status:

2/13/98

- Finalizing the development schedule and product specification.
- Outside process consultant selected, contract and NDA are in place. First meeting held 11/3. Preliminary report was received 12/15. Final report due the week of March 1st.
- Investigating possible conceptual design paths to meet cost objectives.
- New concept barrel analysis was completed with excellent results. Fire control analysis is in process. Anticipated completion date is 3/10/98.
- Competitive evaluation test added to program. Six (6) guns (ea) from four (4) different manufacturers as well as ammunition to complete the test.

Areas of Concern:

- Product definition and specifications need to be finalized.

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Sportsman M/710 Development Schedule

- ☐ **Project Definition -----** September, 1997
 - ✓ **Process Investigation -----** September, 1997
 - ✓ **Concept Design Phase -----** October , 1997
 - **Concept Program Review 1 -----** February 20, 1998
- ☐ **Preliminary Design Phase -----** Q2 1998
- ☐ **Initial Prototype Evaluation Phase -----** Q3 1998
- ☐ **Design Phase -----** Q3 1998
- ☐ **Engineering Evaluation Testing -----** Q4 1998
- ☐ **Final Design -----** Q1 1999
- ☐ **Design Acceptance Test -----** Q2 1999
- ☐ **Design Transmittal -----** Q3 1999

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Marketing Specifications

- ☐ Bolt action centerfire rifle to compete with Savage, Marlin, Ruger, etc.
- ☐ Synthetic stock with recoil pad & swivel studs
- ☐ Reasonable bolt action grade trigger
- ☐ Inexpensive metal finish (uniform without turn rings)
- ☐ Inexpensive adjustable sights as option
- ☐ MSP \$229 (non-magnum synthetic)
- ☐ NSP \$188 (non-magnum synthetic)
- ☐ Target Margin 45% (non-magnum synthetic)
- ☐ Target manufacturing cost \$103 (non-magnum synthetic)

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Design For Manufacturability

- ☐ Cost effective state of the art processes
- ☐ Reduce overall part count
- ☐ Reduce individual part cost
- ☐ Reduce assembly costs
- ☐ Reduce WIP costs
- ☐ Extend design to build to order
- ☐ Target \$103.00 or less manufactured cost

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Design for Performance

- ☐ Benchmark should be M/700
 - ✓ Safety
 - ✓ Performance
- ☐ Competitive analysis of best of the rest
 - ✓ Savage, Marlin, Ruger
 - ✓ Browning, Winchester
- ☐ Value added technology only
- ☐ Target cost \$103.00

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Design Approach

- ☐ Open ended design
 - ✓ .22 caliber to 12 gauge
 - ✓ Centerfire rifle to black powder to shotgun
- ☐ Maintain three rings of steel
- ☐ Design a platform to build product families around
 - ✓ Bolt
 - ✓ Fire Control
 - ✓ Barrel

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Unidiameter Bolt

- ☐ Locking lugs and bolt body are same diameter
 - ✓ No broaching
- ☐ One piece bolt body and handle
- ☐ Easily field strippable
- ☐ Interchangeable bolt head
 - ✓ One bolt body and handle
 - ✓ Head allows .22 caliber to 12 gauge

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Sportsman M/710 Unidiameter Bolt



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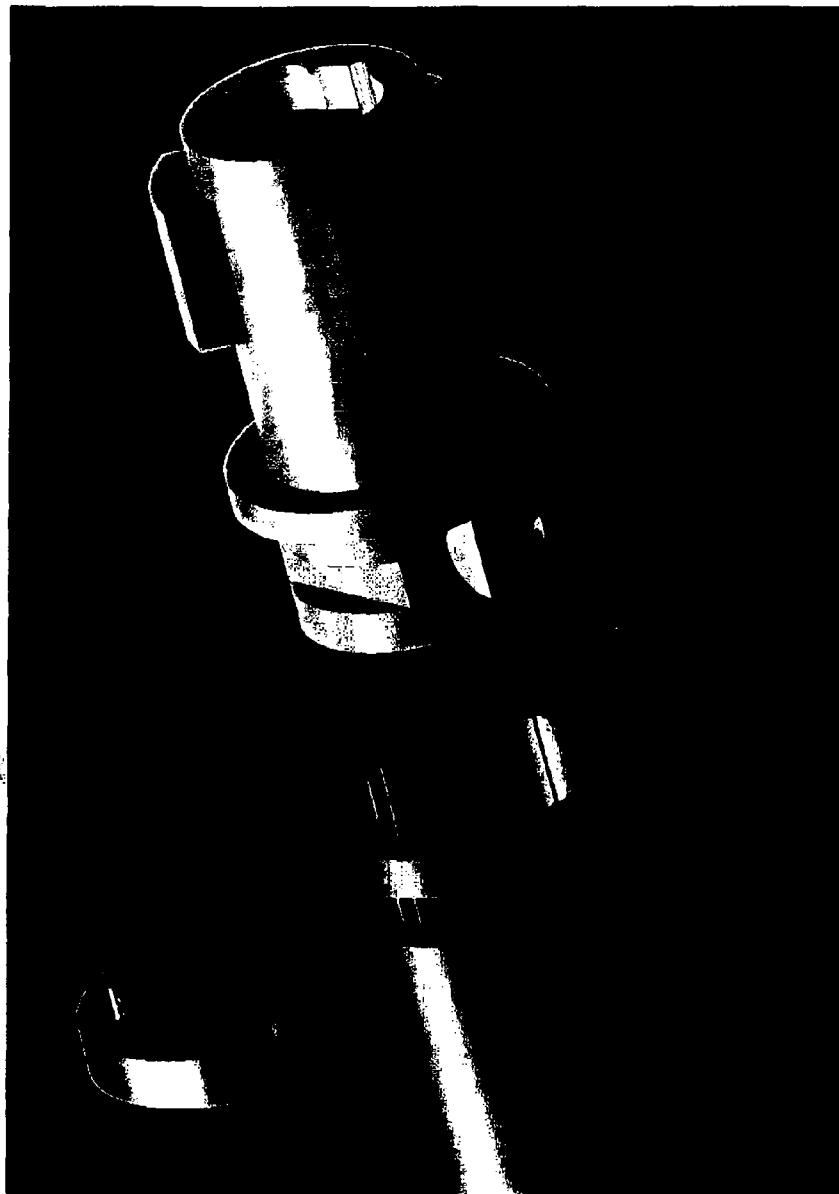
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Sportsman M/710 Interchangeable Bolt Head



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Firecontrol

- ☐ Affordable performance
 - ✓ Linkage system
 - ✓ Adjustable trigger pull and travel
 - ✓ .010 in. of trigger travel (minimum)
 - ✓ Crisp trigger pull
 - ✓ Synthetic trigger housing possible
- ☐ Safety features
 - ✓ System return
 - ✓ 3 position safety
- ☐ Tolerance insensitive

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Sportsman M/710 Fire Control



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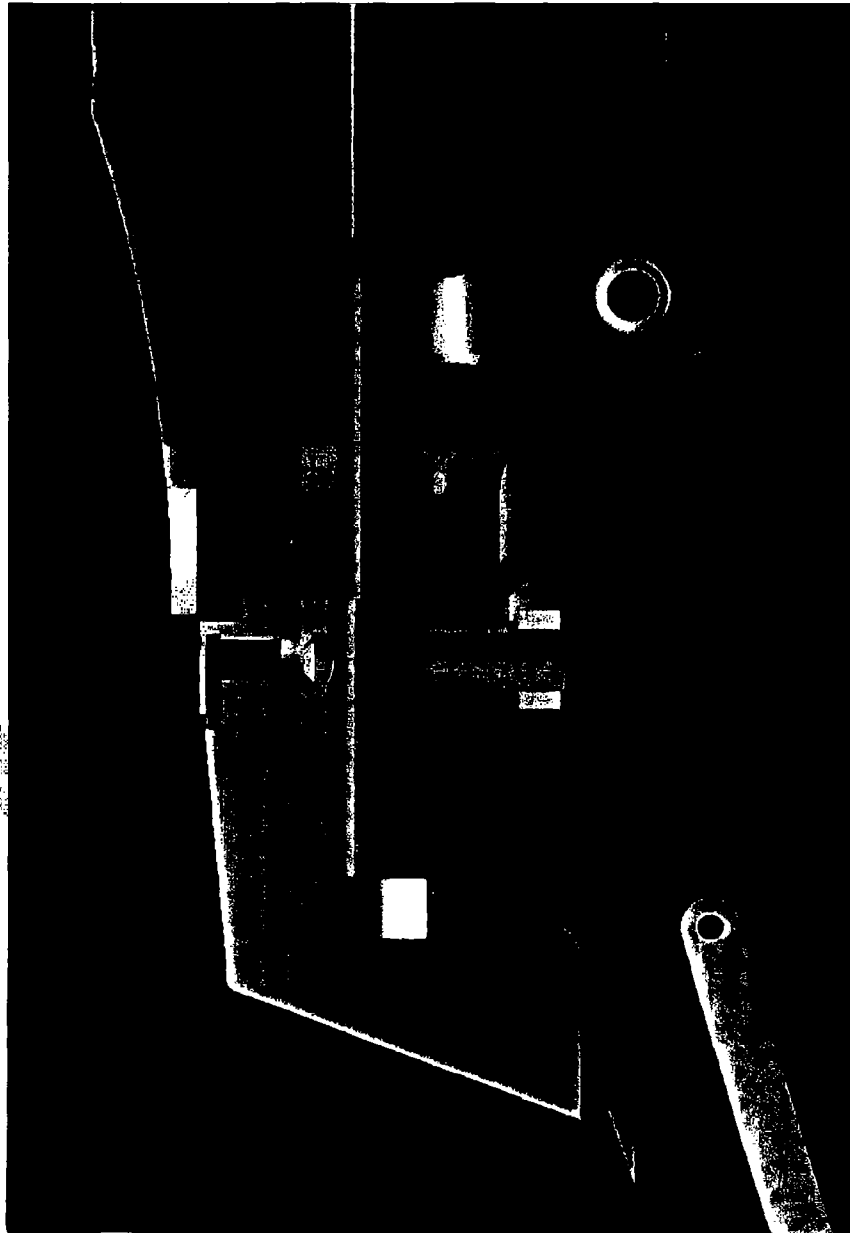
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Sportsman M/710 Fire Control & Bolt Interaction



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So What?

- ☐ One bolt, one firecontrol, one barrel blank
 - ✓ Parts commonality
 - ✓ Reduce WIP
- ☐ Receiver independent
 - ✓ Strong enough for 3rd ring of steel
- ☐ Low cost family differentiation
 - ✓ Receiver
 - ✓ Stock

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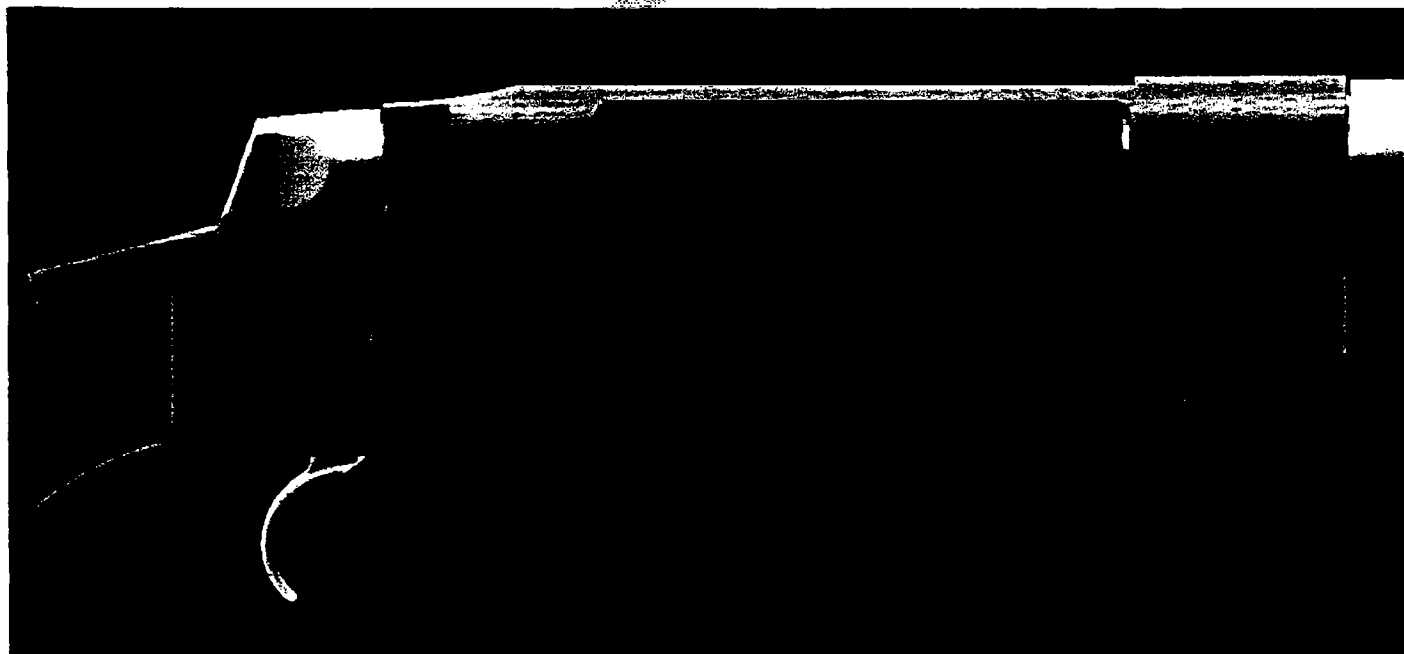
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Non-traditional

- Investment Casting
- Near Net Shape
- Reduced Secondary Machining



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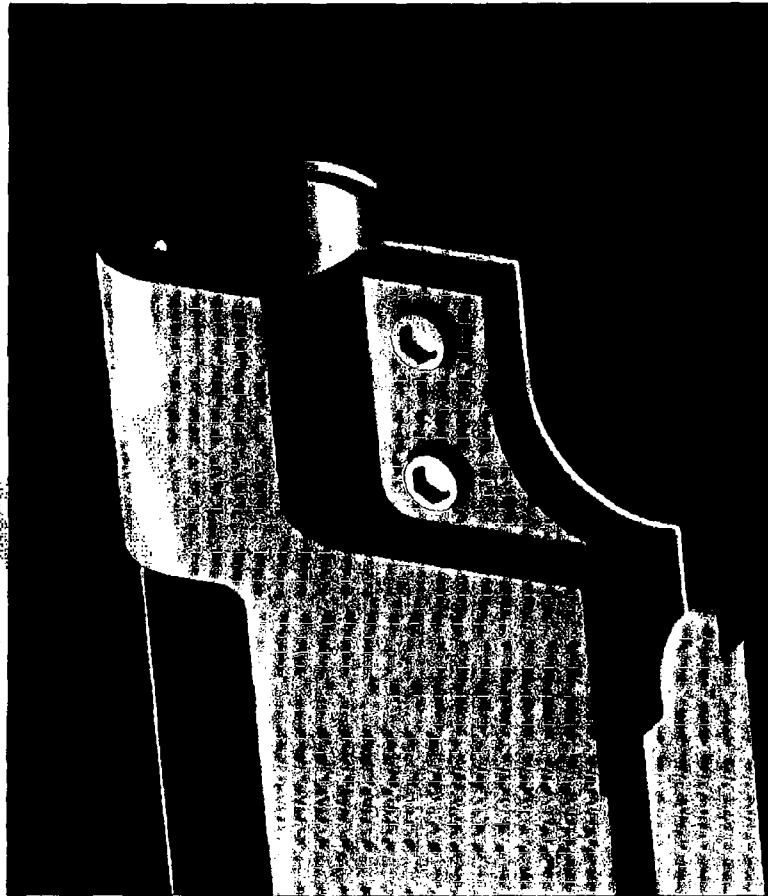
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Sportsman M710; Non-traditional Clampable Barrel

- Elimination of Barrel Threading Operations



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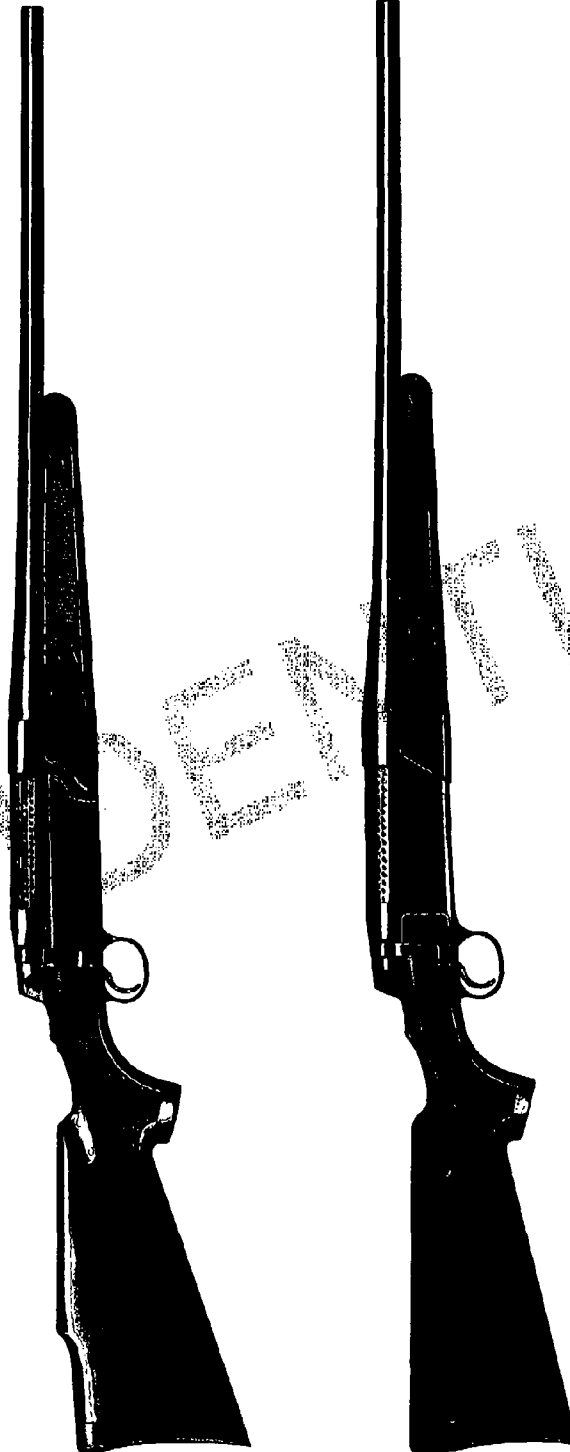
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Sportsman M710; Non-traditional Two Piece Stock Design

- Monte Carlo and Straight Comb Stocks



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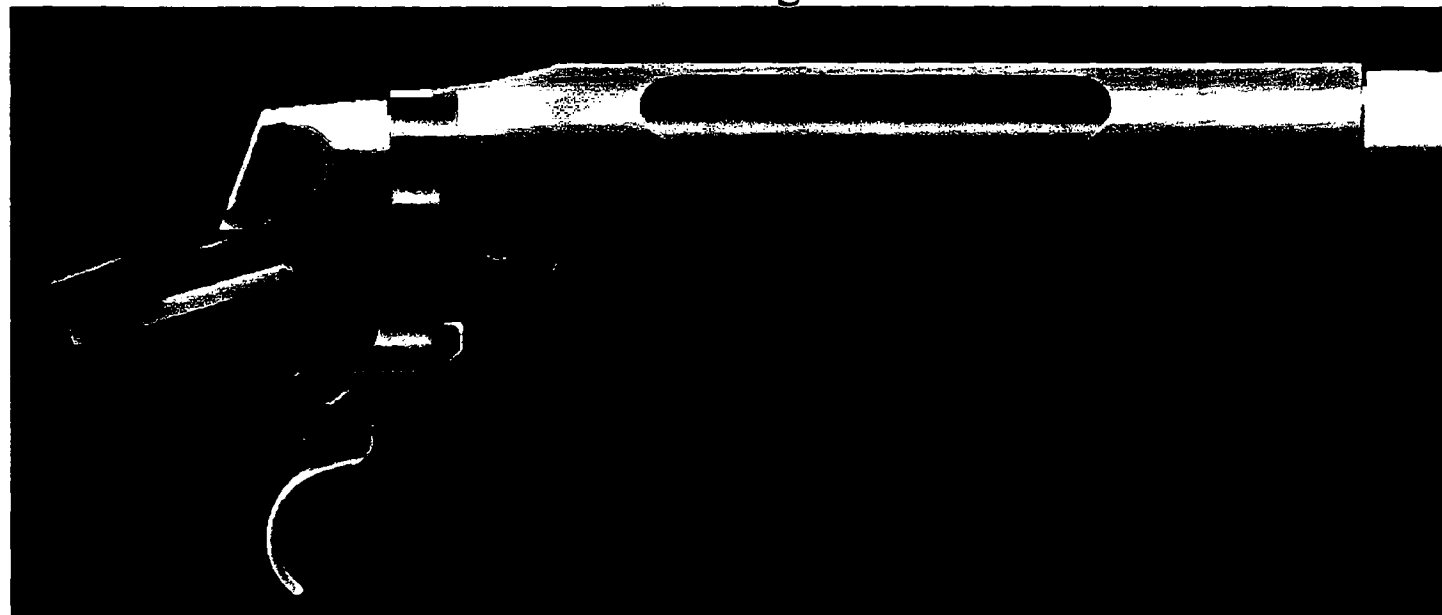
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Traditional

- Conventional receiver look
- Styled after the M/788
- Investment casting or extruded tube



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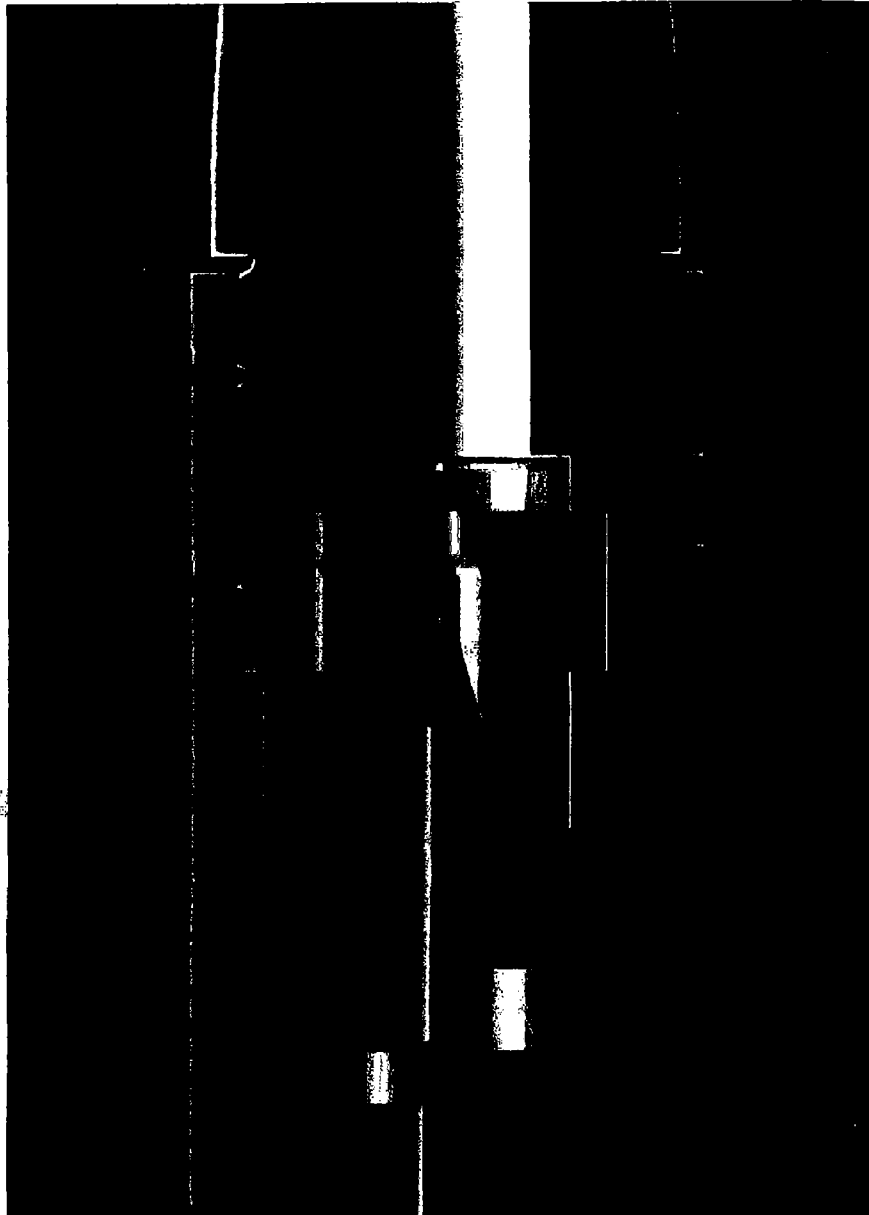
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Sportsman M710; Traditional Threaded barrel



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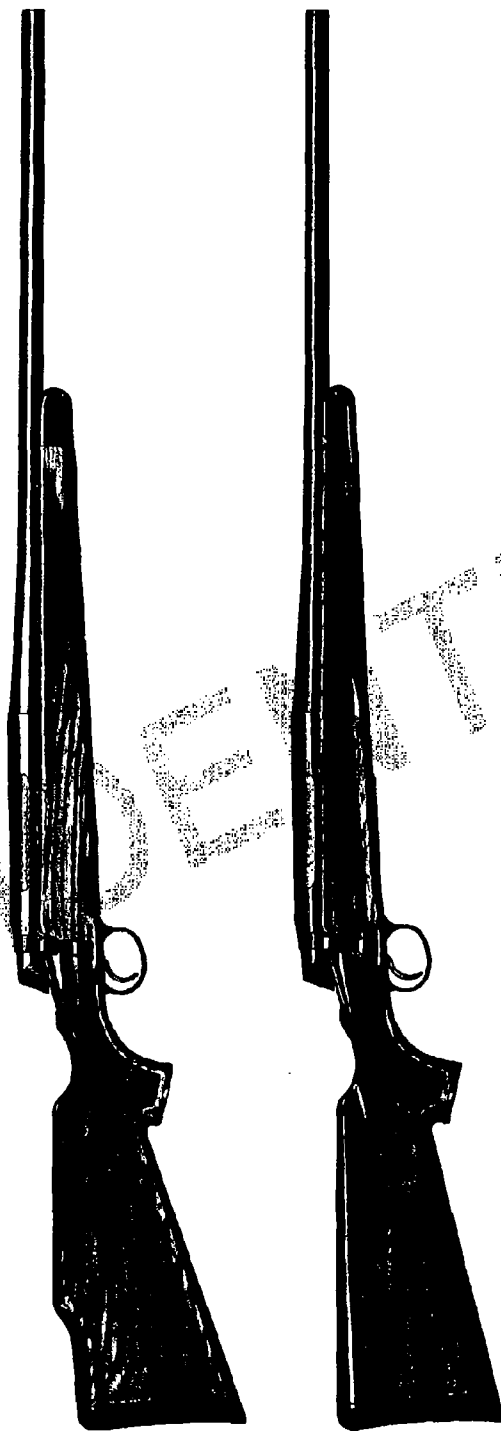
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Sportsman M/710 One Piece Stock

- Monte Carlo and Straight Comb Stocks



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Sportsman M/710 Features

- ☐ Three position safety
- ☐ Bolt lock
- ☐ System return firecontrol
- ☐ Adjustable trigger pull
- ☐ Adjustable trigger travel
- ☐ Lower bolt lift forces
- ☐ 60 deg. bolt throw
- ☐ Cost reduction and manufacturable
 - ✓ Design for simplicity
 - ✓ Reduce component count & tolerance sensitivity
 - ✓ eliminate costly processes (broaching)
 - ✓ Incorporate cost effective processes
- ☐ Full Family
 - ✓ Centerfire
 - ✓ Shotshell
 - ✓ Black Powder

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Features Comparison

	MSP	System Return	60° Bolt Throw	Three Position Safety	Bolt Lock	Magnum Offering	Shot Shell	Black Powder
Sportsman M/710	\$229.00	√	√	√	√	√	√	√
Savage M/111	\$240.00			√	√	√	√*	
Marlin MR-7	\$353.00			√	√		√**	
Winchester M/70 Ranger	\$304.00			√	√	√		
Ruger M- 77RMKII	\$338.00			√	√	√		√
Browning A Bolt II	\$374.00		√		√	√	√*	

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