

D. P. Report in '47 folder

CC:

April 30th, 1947

TO: H. A. Brown
FROM: W. E. Leek
SUBJECT: STRENGTH FEATURES
M/721 REMINGTON VS. M/70 WINCHESTER

For Pate. & Leek

Attached is a brief report of the results obtained by subjecting M/721 Remington and M/70 Winchester rifles to tests of destruction. Numerous other strength tests on the M/721 are covered in a report of pre-pilot testing dated 4/17/47.

In every condition the chamber end of the barrel was plugged with 3 - 220 grain bullets in such a manner that the nose of a loaded round would contact the base of the nearest bullet in the barrel.

The reader's attention is directed to the fact that if the design of the gun will prevent a cartridge case rupture, fracture of the Barrel, Bolt and Receiver will not occur. It is the objective of these tests to prove that such a design is inherent in the M/721 Remington action, making its strength superior to the M/70 Winchester action.

W.E.L.

STRENGTH FEATURES

M/721 - Photograph A and B show cross section of the Barrel, Bolt and Receiver. Standard ammunition used.

- Section A - 1. Slight rupture of base of cartridge case allowed only by expansion of shrouded Bolt Ring.
2. Ring of shrouded Bolt Head, although expanded, retained base of ruptured cartridge.
3. No apparent effect on Barrel.
4. No apparent effect on Receiver.
- Section B - 1. Bolt beyond inletted ring unaffected.
2. Receiver unaffected.

Results of Test

1. Impossible to unlock Bolt.
2. Measurements show no movement of the 4 - 220 grain lodged bullets.
3. Firing Pin moved rearward past cocking position but was retained in Bolt.

M/70 Winchester - Photograph C (top). Standard ammunition used.

Results of Test

1. Measurements show no movement of the 4 - 220 grain lodged bullets
2. Barrel was apparently unaffected by this test.
3. Receiver completely fractured as shown in photograph
4. Bolt unaffected but unlocked and moved rearward.
5. The head of the cartridge case had disintegrated.

M/721 - Photograph C (bottom). Same conditions but with a shell, containing ^{high pressure} ~~above proof pressure~~ ^{was} ~~above normal proof loading~~.

Results of Test

1. Impossible to unlock Bolt.
2. Bolt Handle was broken when subjected to abnormal unlocking pressure.
3. Firing Pin moved rearward past the cocking position but ^{was} retained in Bolt.

4. Pressure exerted apparently had no effect on the Bolt, Barrel or Receiver with the exception of swelling the ring of the threaded Bolt Head.
5. Measurements show that enough force was developed by the shell loaded above proof loading to push the 4 - 220 grain bullets out of the Barrel.

Discussion:

These tests prove that the threaded Bolt Head in the M/721 Action completely retains the base of the cartridge, not allowing it to expand sufficiently to cause complete rupturing of the cartridge case. On the other hand, in the M/70 Winchester, the base of the cartridge is not retained within the Bolt and under certain conditions of excess pressure or defective ammunition, this design will allow the cartridge case to expand unsupported to such a degree that the base of the cartridge case will rupture, directing the expanding powder gases against the Receiver section, causing the receiver to fracture.

Conclusion:

It is to be concluded that the design of the M/721 does prevent cartridge case rupture under conditions of excessive chamber pressure or defective ammunition, and that the strength of the M/721 Action is superior to the M/70 Winchester.