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Report No. 65/1-1

June 16th, 1932.

EXPERIMENTAL HEAT TREATMENT OF PISTOL BARRELS FOR SPRINGFIELD

25 FORGINGS FROM CRUCIBLE STEEL, LETTERED J.

30 FORGINGS FROM MORRIS STEEL, LETTERED M.

LOT NO. 1

Pieces treated in this lot were J-1 to J-5 inclusive.
M-1 to M-5 inclusive and Test Piece A.

Treatment as follows:

Anneal at 1600°F - 2 hours at temperature, furnace cool. Heat to 1550°F in salt bath (Used Lavite Electric furnace and Carbon Lavite No. 130 as salt). 1/2 hour at temperature.

Quench in Houghtons No. 2 Soluble Quenching Oil.
Draw at 1100°F - 2 hours at temperature, oil quench.

Hardness readings

	<u>Brinell</u>		<u>Brinell</u>
M-1	241	J-1	269
M-2	235	J-2	269
M-3	228	J-3	269
M-4	241	J-4	241
M-5	235	J-5	269
Test "A"	235		

LOT NO. 2

Pieces treated J-6 to 10 inclusive. M-6 to 10 inclusive, Test piece "B".

Treatment as follows:

Anneal 1600°F - 2 hours at temperature, furnace cool.
Preheat to 1300°F - 1 hour at temperature.
Transfer to 1550°F - 1/2 hour at temp. - oil quench.
Draw at 1100°F - 2 hours at temp. - oil quench.

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Hardness Readings

	<u>Brinell</u>		<u>Brinell</u>
M-6	228	J-6	255
M-7	228	J-7	255
M-8	228	J-8	262
M-9	228	J-9	255
M-10	223	J-10	255
Test "B"	228		

LOT NO. 3

Pieces treated J-11 to 15 inclusive. M-11 to 15 inclusive, Test Piece "C".

Treatment as follows:

Anneal 1600°F - 2 hours at temp. - furnace cool.
1575°F - 1/2 hour at temp. in Salt Bath
(Lavite Electric Furnace and Carbon Lavite No. 130). Quench
in oil.

Draw 1100°F - 2 hours at temp. - quench in oil.

Hardness Readings

	<u>Brinell</u>		<u>Brinell</u>
M-11	228	J-11	269
M-12	212	J-12	255
M-13	241	J-13	269
M-14	235	J-14	248
M-15	228	J-15	269
Test "C"	255		

LOT NO. 4

Pieces treated J-16 to 20 inclusive. M-16 to 20 inclusive, Test piece "D".

Treatment as follows:

Anneal - 1600°F - 2 hrs. at temp. furnace cool
Preheat - 1300°F - 1 hr. at temp.
Transfer to 1575°F - 1/2 hr. at temp. oil quench.
Draw at - 1100°F - 2 hrs. at temp.

Hardness Readings

	<u>Brinell</u>		<u>Brinell</u>
M-16	228	J-16	255
M-17	228	J-17	255
M-18	235	J-18	248
M-19	228	J-19	255
M-20	228	J-20	255
Test "D"	228		

LOT NO. 5

Pieces treated J-21 to 25 inclusive. M-21 to 25 inclusive, Test piece "E".

Treatment as follows:

Anneal 1600°F - 2 hours at temp. furnace cool.
Place in cold furnace and bring up to 1550°F -
hold 2 hours at temp. - oil quench.
Draw 1100°F - 2 hours at temp. oil quench.

Hardness Readings

	<u>Brinell</u>		<u>Brinell</u>
M-21	223	J-21	255
M-22	241	J-22	235
M-23	228	J-23	235
M-24	223	J-24	241
M-25	235	J-25	241
Test "E"	235		

LOT NO. 6

Pieces treated M-26 to 30 inclusive, Test Piece "F".

Treatment as follows:

Anneal 1600°F - 2 hours at temp. furnace cool.
Heat up with furnace to 1600°F-hold 1 hour at
temperature - oil quench.
Draw 1100°F - 2 hours at temp. - oil quench.

Hardness Readings

	<u>Brinell</u>		<u>Brinell</u>
M-26	223	M-29	228
M-27	228	M-30	223
M-28	228	Test "F"	228

Rockwell readings were not taken because of difficulty in securing a true reading, without removing stock from barrel - this was not done because of the possibility of spoiling forgings.

In the above work - except where salt bath was used for heating - all heating was done in a Hoskins Electric Furnace Type F.H. 207 - controlled with an automatic temperature control, operated by a Leeds & Northrup recording potentiometer.

The salt bath was electrically heated, and automatically controlled, salt being Lavite No. 130.

In all cases the quenching oil was Houghton's No. 2 Soluble.

M.O. Snyder