File.

O T T A W A March 26, 1945.

R E P O R T

of the

ORE DRESSING AND METALLURGICAL LABORATORIES.

Investigation No. 1821.

Corrosion Resistance of Electroplated Steel Parts.

(Copy No. 10.)

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Origin of Request and Object of Investigation:

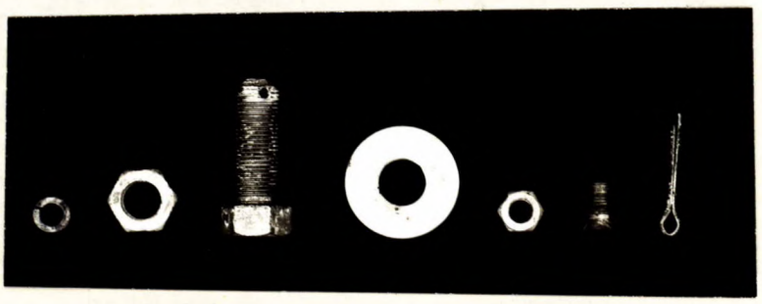
A letter (File No. 12/4/6), dated February 27, 1945, was received from the Inspection Board of United Kingdom and Canada, 71 Lyon Street, Ottawa, Ontario, requesting that thirteen (13) small cadmium-plated steel parts (submitted under Analysis Requisition No. 4334) be tested in the salt spray, the details of the test being left to our discretion. Plated parts of this kind are being used in the bodies of trucks and other vehicles.

Results of Test:

The parts were tested in the 20 per cent salt spray at 95° F. for approximately 230 hours. It is believed that cadmium-plated parts for this type of service should be able to withstand the action of the salt spray for this length of time.

The condition of the parts at the end of the test is shown in Figures 1 and 2. Those in Figure 1 had little or no iron rust on them while those in Figure 2 had considerable iron rust.

Figure 1.



CADMIUM-PLATED STEEL PARTS WHICH WITHSTOOD THE ACTION OF THE SALT SPRAY FOR 230 HOURS.

Little or no rust is evident on these parts although, of course, there is a certain amount of cadmium corrosion product.

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Figure 2.

a b c d e f

CADMIUM-PLATED STEEL PARTS WHICH RUSTED DURING THE 230 HOURS IN THE SALT SPRAY.

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LOG OF THE TEST.

After 15 hours - Cotter pin (a in Figure 2) began to rust.
After 90 hours - Washer (e in Figure 2) began to rust.
After 160 hours - Large nut (c in Figure 2) began to rust on all sides.
After approximately 200 hours - The parts marked b, d and f began to rust.

(Continued on next page)

(Results of Tests, cont'd) -

It will be noted that one cotter pin failed and one remained good; also, that two small washers failed and one remained good.

Conclusion:

It is presumed that all of these parts were plated in the plating barrel. If they were all plated in the same batch it would appear that there was not sufficient movement of the parts during the operation. If they were plated in different batches the conclusion is that all batches did not have the same treatment. Some of the batches may have been faulty with regard to time of plating, current density, cadmium content of plating bath, size of batch, amount of movement of the parts being plated, etc.

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