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Bridgeport, Connecticut, July 6, 1938

TO: H. A. BROWN

FROM: E. C. HADLEY

SUBJECT: FIRING PIN POSITION AND INDENTATION FOR NEW .22 CALIBER
 STANDARDIZED BOLT ACTION RIFLES

DISCUSSION OF ADOPTION OF PIN FOR DROP TEST BY THE TECHNICAL
 COMMITTEE OF S.A.A.M.I.

This letter refers to our letter to you dated June 8 and reply of June 17 by K. J. Lowe.

We appreciate receiving the information contained in letter of June 17 and feel that many on the list receiving copies also found this information of value.

As indicated in the subject of this letter, the conditions of testing rim fire ammunition were standardized at the last meeting of the Technical Committee of the Institute on June 23. Attached to this letter you will find a drawing No. EX8126 which shows the dimensions of the newly adopted drop test pin and an enlarged drawing showing the standard relation of this drop test pin to the head of the cartridge. You will note that the dimension of the rectangular appearing portion of the striker, a part of which contacts the head of the cartridge, is .020 x .125. It was agreed that the pin in question (weight 70 grs. plus or minus 5 grs.) should be used with a 2-oz. weight. The heights of drop at which all shells must fire and must misfire to be considered satisfactory are:

2 oz. weight 15" - 100% clear

2 oz. weight 2" - 100% misfire

The drop test described above is substantially, but not exactly, that which has been in use for some time by the Winchester Company. You will observe by reference to the drawings made at the Western Cartridge Company plant of 57 firing pins that most of the Winchester pins have shapes somewhat similar to this standard shape, although, in general, not as narrow as .020.

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For many years, the standard drop test pin at Bridgeport was a cylindrical one with a hemispherical striking point. This pin had a diameter of .100. Various shapes of pins have been used for special tests but particularly extensive use has been made of a pin shape like that of the Model 341. The use of this pin was stimulated by misfire troubles in the field with the Model 341. Manufacturing difficulties were experienced during several months toward the end of 1937 in rim fire production. One of the results of the increased testing activity of the last few months was the adoption of the Model 341 type of pin as standard for testing at Bridgeport. We speak of this as an indication of the trend toward having drop test pins similar in shape to the firing pins used in guns being largely manufactured.

We believe there is general agreement that it would be poor practice for the arms industry to be making such a multiplicity of firing pins as are shown in Western Cartridge Company drawings referred to above. On the other hand, we think that a reasonable degree of simplification of firing pins would be approved by every one, subject, of course, to peculiarities in design of certain arms which might require firing pins of special sorts.

Aside from the tendency toward standardization upon the rectangular appearing type of striking surface, there seem to be two other advantages. One is that, in general, less spring tension is required when this type of firing pin is used as compared with a cylindrical firing pin with a flat end of the dimension now shown for the Models 510, 511, 512 and 513. The other is that any misplacement of the firing pin making it strike further from or nearer to the center of the head of the cartridge has less effect upon the igniting blow in the case of the firing pin having the rectangular appearing striking surface than in the case of the circular shaped firing pin.

Summarizing the argument for the firing pin having the rectangular appearing striking surface, we have the following points:

1. It would tend to be in line with trends which have resulted in the adoption of this general shape for standard drop tests.
2. The use of a pin of this shape would put us into a better position to urge standardization upon others should that prove desirable.

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3. Expected lesser variation in effective blow of firing pin due either to eccentricity in position of firing pin or variation between maximum or minimum shell head diameters.
4. Greater ease of operation of arm inasmuch as a more easily compressible spring is expected to perform satisfactorily with rectangular appearing type of firing pin.

Summarizing the argument for a cylindrical flat end firing pin, we have chiefly, and perhaps only the point of lesser manufacturing cost.

These are the things which should be weighed against each other. Perhaps there are others which we have not mentioned. Perhaps you will disagree with some of the points which have been made here or as to their significance. We believe, however, that it is agreed that the shape of the firing pins for the Models 510, 511, 512 and 513 should have further careful discussion and a general agreement between the arms and ammunition plants if that is possible.

We shall appreciate it, therefore, if you will have this matter considered at Ilion and, if agreeable to you, advise all of those receiving copies of this letter, as well as the writer, of the further opinion that you may have on this subject.

It should be borne in mind that we are not prepared to say that the Institute shape should be duplicated. Indeed, we are inclined to think that if such a general shape were used, it might be better to have a greater width than .020.

Some of our people here are still of the opinion that we should have one or more models down here for test. It is possible that one of these models should be equipped with several different shapes of firing pin and different strengths of spring. On the other hand, if it seems desirable to you to approach the problem of firing pin from that angle we would prefer to have you consider such variations in firing pin point and spring test at Ilion prior to sending them down to Bridgeport. In that event, we urge your sending one or more models as they now exist to Bridgeport for test in the Research Department and in the Ballistic Division.

The Research Division do not feel that they are capable of determining from the data in a drawing as to whether the new design rifle will function satisfactorily with present day .22 caliber ammunition.

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We are suggesting to the Ballistic Division that they have some drop test pins made up with the circular flat end Ilion point. We believe some testing here with that pin may be of interest.

This general subject was discussed somewhat with Loomis by the writer at the Institute meeting on June 23. We shall be interested in results of comparative indentation tests which were discussed with Loomis at that time.

ECH:VC