

PATENT SPECIFICATION (11)

1 394 955

1 394 955

- (21) Application No. 51999/73 (22) Filed 8 Nov. 1973 (19)
 (31) Convention Application No. 169 095 (32) Filed 23 Nov. 1972 in
 (33) New Zealand (NZ)
 (44) Complete Specification published 21 May 1975
 (51) INT. CL.² B26B 13/00
 (52) Index at acceptance
 B4B 80E2 80M2 80X
 B3A 142



(54) A SURFACE HARDENED STEEL CUTTING BLADE

(71) I, JOHN ALLEY HOUGH, a British Subject and New Zealand Citizen of 14 Downsview Road, Pakuranga, Auckland, New Zealand, do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to an improved surface hardened steel cutting blade for use in a shearing manner against another blade. Where both blades are hardened, problems occur with chipping on the return stroke since the two hardened cutting edges of the blades tend to lift or chip portions of the surface hardening out of the other blade as they pass.

An object of the invention is to eliminate or at least largely reduce the problem of chipping of the hardened case.

According to one aspect of the invention there is provided a surface hardened steel shearing blade wherein the shearing face of the blade has a hardened surface of from 0.002 to 0.008 inches thick, and a hardness exceeding 60 Rockwell C, the hardened surface being backed by a softer layer, the softer layer being exposed at the leading edge of the blade.

The invention also provides shears comprising a blade according to the first aspect of the present invention.

For a better understanding of the invention and to show how the same may be put into effect, reference will now be made, by way of example, to the accompanying drawings, in which:—

Figure 1 shows an elevation of a typical cutting blade for a pair of shears (an overlapping blade being dotted in),

Figure 2 shows a partial cross section through two shear blades at the point of contact,

Figure 3 shows a partial cross section through a hardened shear blade prior to grinding, and

Figure 4 shows a partial cross section through two prior art shear blades, hardened after grinding.

[Price 33p]

In the drawings, the blade 1 has a hardened surface 2 and a cutting edge 3. There are various ways of providing the cutting edge. For example, in Figure 4, the cutting edge 3A is formed by the intersection of the shearing face 2A and leading edge 4A, the leading edge being shaped by grinding or otherwise prior to a case hardening process. There is therefore a hardened layer 5A encasing the blade and it has been found that the cutting edge 3A tends to chip away, especially on the return stroke of the blades and thus renders the blades relatively ineffective and harsh in operation.

As Figure 3 shows, the problem may be at least partially overcome by grinding away the edge 9B to remove the hardened case 5B in that region, the cutting edge 3B being formed at the intersection of the shearing face 2B and a new leading edge 4B formed along the line X—X during the grinding process.

As Figure 2 shows, it is also possible to arrange the hardening process so that only the shearing face surface 2C is hardened, perhaps together with the rear face 6C. The hardened case 5C is an area which is rich in carbon, the carbon having been inserted by laminating a carbon rich layer during a rolling process to a base of lower carbon content or by suitably introducing carbon by a step in a case hardening process. This has the effect of the construction shown in Figure 3 of eliminating the hardened surface along the leading edge 4C. However, it has been found that with both of the constructions shown in Figures 2 and 3, the thickness of the hardened skin 5 is relatively critical. The precise thickness will vary with the hardness achieved and also with the difference in hardness between the layer 5 and the core 7. The thickness of hardened layer 5 is from 0.002 to 0.008 inches when the hardness exceeds 60 Rockwell C but is preferably less than 75 Rockwell C and this is suitable where the core 7 has a hardness of up to 50 Rockwell C, preferably from 10–50 Rockwell C. In both cases the base material of the blade is mild steel, having an analysis of about Fe 99%—Mn 0.4%

21

—C 0.12—other elements 0.48%—all percentages being by weight. A preferred thickness is 0.005 to 0.006 inches.

5 One result of the invention is to provide a shear blade where chipping is eliminated or at least substantially reduced during cutting and return strokes.

WHAT I CLAIM IS:—

10 1. A surface hardened steel shearing blade wherein the shearing face of the blade has a hardened surface of from 0.002 to 0.008 inches thick, and a hardness exceeding 60 Rockwell C, the hardened surface being
15 backed by a softer layer, the softer layer being exposed at the leading edge of the blade.

20 2. A blade according to Claim 1, wherein the hardened surface is from 0.005 to 0.006 inches thick.

3. A blade according to Claim 1 or 2, wherein the hardened surface is between 60 and 75 Rockwell C.

25 4. A blade according to any one of the preceding claims, wherein the hardness of the softer layer is up to 50 Rockwell C.

5. A blade according to Claim 4, wherein the hardness of the softer layer is from 10 to 50 Rockwell C.

30 6. A blade according to any one of the

preceding claims, wherein the hardened surface is provided by a 0.002 to 0.008 inch thick carbon rich steel layer laminated to the base of the blade.

7. A surface hardened steel shearing 35 blade wherein the shearing face of the blade has a hardened surface of from 0.002 to 0.008 inches thick, and a hardness between 60 and 75 Rockwell C, the hardened surface being backed by a softer layer, the
40 softer layer having a hardness between 10 to 50 Rockwell C and being exposed at the leading edge of the blade.

8. A surface hardened steel shearing 45 blade substantially as hereinbefore described with reference to, and as shown in, Figures 2 or 3.

9. Shears comprising a blade according to any one of the preceding claims.

FORRESTER, KETLEY & CO.,
Chartered Patent Agents,
Forrester House,
52 Bounds Green Road,
London, N11 1EY,
and
Rutland House,
148 Edmund Street,
Birmingham, B3 2LD.
Agents for the Applicant.

21 —C 0.12—other elements 0.48%—all percentages being by weight. A preferred thickness is 0.005 to 0.006 inches.

5 One result of the invention is to provide a shear blade where chipping is eliminated or at least substantially reduced during cutting and return strokes.

WHAT I CLAIM IS:—

10 1. A surface hardened steel shearing blade wherein the shearing face of the blade has a hardened surface of from 0.002 to 0.008 inches thick, and a hardness exceeding 60 Rockwell C, the hardened surface being 15 backed by a softer layer, the softer layer being exposed at the leading edge of the blade.

20 2. A blade according to Claim 1, wherein the hardened surface is from 0.005 to 0.006 inches thick.

3. A blade according to Claim 1 or 2, wherein the hardened surface is between 60 and 75 Rockwell C.

25 4. A blade according to any one of the preceding claims, wherein the hardness of the softer layer is up to 50 Rockwell C.

5. A blade according to Claim 4, wherein the hardness of the softer layer is from 10 to 50 Rockwell C.

30 6. A blade according to any one of the

preceding claims, wherein the hardened surface is provided by a 0.002 to 0.008 inch thick carbon rich steel layer laminated to the base of the blade.

7. A surface hardened steel shearing 35 blade wherein the shearing face of the blade has a hardened surface of from 0.002 to 0.008 inches thick, and a hardness between 60 and 75 Rockwell C, the hardened surface being backed by a softer layer, the 40 softer layer having a hardness between 10 to 50 Rockwell C and being exposed at the leading edge of the blade.

8. A surface hardened steel shearing 45 blade substantially as hereinbefore described with reference to, and as shown in, Figures 2 or 3.

9. Shears comprising a blade according to any one of the preceding claims.

FORRESTER, KETLEY & CO.,
Chartered Patent Agents,
Forrester House,
52 Bounds Green Road,
London, N11 1EY,
and
Rutland House,
148 Edmund Street,
Birmingham, B3 2LD.
Agents for the Applicant.

Printed for Her Majesty's Stationery Office by Burgess & Son (Abingdon), Ltd.—1975.
Published at The Patent Office, 25 Southampton Buildings, London, WC2A 1AY,
from which copies may be obtained.



* C L N S *