

M1 2026 – Part 1

Company X develops and manufactures metallic hand planes in Denmark. Hand planes are used in traditional woodworking.

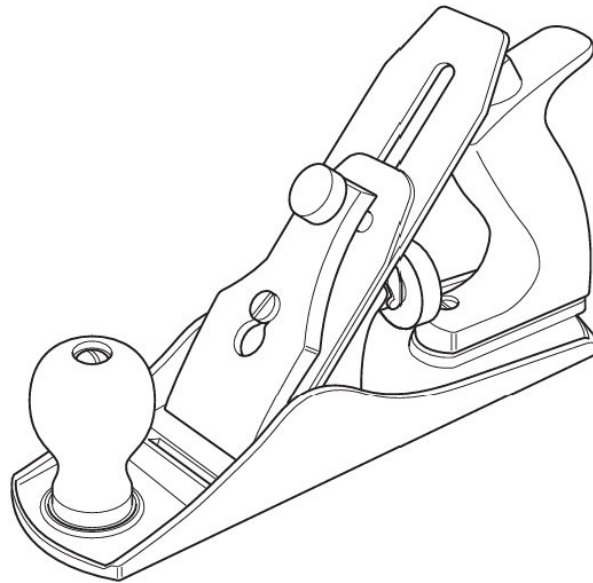


Figure 1: Metallic hand plane

Company X filed a Danish patent application DK-1 on 1 January 2025.

DK-1 description:

Metallic hand planes are used in traditional woodworking. A hand plane comprises a plane body and a cutting knife. It is known from D1 to coat metallic hand plane bodies with a polymeric material to reduce friction when in use on a wooden work-piece.

PTFE (polytetrafluoroethylene) has been known and used as a polymeric material for the coating. The coating may be applied to the metallic plane body by a spray coating process. Such spray coating processes and other coating processes are well known in the art.

However, it has been found that the polymeric coating may separate from the metallic plane body over time and with use. The plane thus becomes defective in terms of reduction of friction. This is a very serious problem.

As a solution to the mentioned problem, it has been found that the polymeric coating adhesion can be made longer lasting by treating the metallic plane body with an acid before applying the polymeric coating. Of all the acids tested, only strong acids have proven effective. There are seven strong acids: chloric, hydrobromic, hydrochloric (HCl), hydroiodic, nitric, perchloric and sulphuric. The acid treatment can be conducted by known methods, such as by dipping the metallic plane body into a bath of strong acid or by bringing the body into contact with a cloth soaked in the strong acid.

As a specific combination, acid treatment of the metallic plane body with hydrochloric acid (HCl) is optimally effective when there is a treatment time below 60 seconds combined with acid temperature at or above 50 degrees Celsius.

As an option, conducting the process employing any of the seven aforementioned strong acids at elevated pressure above 2 bars makes the process more effective. This result is achieved regardless of acid type, treatment times, and temperatures.

DK-1 claims:

A process for coating a metallic surface with a polymeric material characterised in that the metallic surface is treated with an acid prior to coating.

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D1: Publication in “Woodworking” magazine, 1 January 2020

Company X has developed and now markets metallic hand planes having a body coated with a polymeric material to reduce friction. In particular, PTFE has been used as polymeric material for the coating. The polymeric coating can be applied to the metallic plane body by well-known spray coating processes.

D2: Publication in “Chemical Engineers” monthly magazine, 1 January 2020

In industrial applications, strong acids are often utilised in various ways as chemical reagents and oxidisers. Among the countless acids that have been discovered or synthesised, there are strong acids and weak acids. The definition of a strong acid is one that completely dissociates in water, meaning it splits into its principal ions. There are seven strong acids: chloric, hydrobromic, hydrochloric (HCl), hydroiodic, nitric, perchloric and sulphuric.

Metallic surfaces of jewellery can be effectively treated with strong acids, such as hydrochloric acid (HCl), as pretreatment before applying a metal coating like gold or silver. The changed and enhanced surface quality of the metallic surface following the strong acid treatment is clearly visible using an electron microscope. All seven strong acids leave exactly the same visible characteristics on the metallic surface.

D3:

European patent application filed on 1 January 2024 and published by the EPO on 1 July 2025 along with an extended European search report. The applicant is Mr Artisan.

Description:

Hydrochloric acid (HCl) has a large number of uses.

The present invention is directed to a surface treatment to remove impurities on metals before applying a polymeric material by e.g. spray coating. Hydrochloric acid (HCl) requires little time, works at low temperatures and achieves high surface quality .

The treatment process can be used for hand tools, such as bodies of metallic hand planes for woodworking.

Acid treatment time with hydrochloric acid (HCl) can be effective below 60 seconds. The temperature of the acid can be in the range of 40-60 degrees Celsius.

Claims:

1. A process for treating a metallic surface characterised in that the metallic surface is brought into contact with hydrochloric acid (HCl) for a determined period of time.
2. The process of claim 1, characterised in that a metallic surface of a hand tool for woodworking is treated before applying a polymeric coating.

D1 and D2 are mentioned in the search report of D3.

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