Claims

1. A method for surface treatment of a steel mechanical part to improve its resistance to wear and corrosion, comprising at least one nitriding or nitrocarburizing step forming a nitrided surface layer, followed by impregnation of said nitrided layer with a solution comprising at least one hydrophobic wax, characterized in that the wax is an organic carbon-based compound having a molecular weight below 500, and preferably between 200 and 500, the wax being essentially composed of a C20–C35 alkane fraction and calcium sulfonate.

2. Method of claim 1, wherein the nitriding or nitrocarburizing step is followed by oxidation.

3. Method of any preceding claim, wherein impregnation is performed by immersion or spraying at ambient temperature.

4. Method of claim 3, wherein impregnation by immersion lasts at least 2 minutes.

5. Method of any preceding claim, wherein the impregnation solution comprises wax diluted with solvent to 50%, 75%, or 87.5%.

6. Method of any preceding claim, wherein the impregnated part is air-dried for at least 5 minutes at ambient temperature.

7. Method of any preceding claim, wherein the solution comprises calcium sulfonate in an amount between 1% and 30% by mass.

8. Method of any preceding claim, wherein the solution further comprises 1,1'-Biphenyl 4,4'-dibromo ($C_{12}H_8Br_2$).

9. A steel mechanical part having undergone a surface treatment to improve its resistance to wear and corrosion, comprising a nitrided surface layer impregnated with a hydrophobic wax-based solution, wherein the wax is an organic carbon compound having a molecular weight below 500, and preferably between 200 and 500.

10. Mechanical part of claim 9, wherein the wax-based layer has a coating weight between 5 and 60 g/m².

11. Mechanical part of any of claims 9-10, wherein the wax-based layer comprises calcium sulfonate in an amount between 1% and 30% by mass