CLAIMS

1. A coating agent for forming a solid lubrication coating film by being applied to a metal surface, the coating agent comprising: as main components,

a solid lubricant; a binder resin; and a solvent,

wherein the solvent contains water as a main component and a lower alcohol having three or fewer carbon atoms which is added as an additive to the water, and the additive has a volume of 0.5 or more and 10 or less in terms of 100 set as a volume of the water,

wherein 95% or more of a volume of the solvent is composed of the water and the additive,

wherein, as the solid lubricant, black lead and a metal soap account for 95% or more of the weight of all solid lubrication components,

wherein, further as the solid lubricant, an alkaline soap accounts for 0% or more and 1% or less of the weight of all the solid lubrication components,

wherein the black lead accounts for 0.5% or more and 5% or less of the total solid lubricant in terms of a weight ratio, and

wherein the binder resin is a water-soluble or water-dispersible polymer, and the polymer is a polymer or a copolymer containing monomers classified as acrylates or methacrylates in an amount of 90% or more of a total weight of the binder resin.

2. The coating agent for forming a solid lubrication coating film according to claim 1,

wherein, as the additive, ammonia water is further added.

3. The coating agent for forming a solid lubrication coating film according to claim 1,

wherein the binder resin accounts for 30% or more and 40% or less of a total weight of the coating agent,

wherein the solid lubricant accounts for 10% or more and 20% or less of the total weight of the coating agent, and

wherein the solvent accounts for 40% or more and 50% or less of the total weight of the coating agent.

4. The coating agent for forming a solid lubrication coating film according to claim 1,

wherein, of a lower alcohol and ammonia water, at least the lower alcohol is added as the additive as a solvent component to the water which constitutes the solvent, and the lower alcohol is composed of one or two or more kinds of lower alcohols having three or fewer carbon atoms,

wherein a volume of the lower alcohol is 0.5 or more and 10 or less in terms of 100 set as the volume of the water constituting the solvent, and

wherein a volume of the ammonia water is 0 or more and 5 or less in terms of 100 set as the volume of the water constituting the solvent.

5. The coating agent for forming a solid lubrication coating film according to claim 4,

wherein the lower alcohol is a lower alcohol selected from methanol, ethanol, isopropyl alcohol, normal propyl alcohol, and industrial ethanol.

6. The coating agent for forming a solid lubrication coating film according to claim 1,

wherein the black lead has an average particle size of 5 μm or less, and

wherein the metal soap has an average particle size of 5 μm or less.

7. The coating agent for forming a solid lubrication coating film according to claim 1,

wherein the water-soluble or water-dispersible polymer constituting the binder resin is a polymer composed of a single monomer of monomers to be described in the following (1) to (4) or a copolymer composed of two or more monomers of the monomers to be described in the following (1) to (4),

and wherein:

- (1) Monomers including acrylates, methacrylates and individual derivatives of acrylates and methacrylates, as main components;

- (2) Monomers combined with monomers including alkyl esters, vinyl esters, styrene esters, carboxylic acid esters, and individual derivatives of these esters and acrylates and methacrylates, and individual derivatives of acrylates and methacrylates;

- (3) Monomers grafted with respect to the monomers of (1) and (2);

- (4) Monomers constituted by integrating one or both monomers of a vinyl compound and a urethane compound with one or more monomers of at least one of (1) to (3).

8. The coating agent for forming a solid lubrication coating film according to claim 1,

wherein, as the metal soap, one or two or more kinds of metal soaps which are compounds composed of a fatty acid selected from the following A group and a metal element selected from the following B group are contained, and

wherein, as the alkaline soap, one or two or more kinds of alkaline soaps which are compounds composed of a fatty acid selected from the following A group and a metal element selected from the following C group are contained,

and wherein:

- A group: stearic acid, behenic acid, lauric acid, 12-hydroxystearic acid, oleic acid, montanic acid;

- B group: Mg, Ca, Zn, Ba;

- C group: Na, K.

9. The coating agent for forming a solid lubrication coating film according to claim 1, wherein the coating agent has a flash point of 60°C or higher or is nonflammable.

10. The coating agent for forming a solid lubrication coating film according to claim 1, wherein the coating agent has a viscosity of 1,000 mPa·sec or lower.

11. The coating agent for forming a solid lubrication coating film according to claim 1, wherein, when the coating agent is applied to a metal surface at an application amount of 0.1 g/mm^2 or less and is left and dried at an ambient temperature in an atmospheric environment, the coating agent has an early drying property enabling drying to be performed within 30 minutes.

12. The coating agent for forming a solid lubrication coating film according to claim 1, wherein, when the coating agent is applied to a metal surface by an application amount of 0.1 g/mm^2 or less and is dried

by blowing air at 1 m/sec or more at an ambient temperature in an atmospheric environment, the coating agent has an early drying property enabling drying to be performed within three minutes.

13. A method for manufacturing a coating agent for forming a solid lubrication coating film which is a method for manufacturing the coating agent according to claim 1, the method comprising:

formulating the metal soap by dispersing and opacifying the metal soap in the lower alcohol and then putting the metal soap into water of a solvent.

14. A method for repairing oil country tubular goods by which a lubrication film of a thread portion for oil country tubular goods is repaired, the method comprising:

applying the coating agent for forming a solid lubrication coating film according to any one of claims 1 to 12 to at least a cured part after curing a region where galling has occurred in the thread portion for oil country tubular goods.

15. A method for improving lubrication of oil country tubular goods, the method comprising:

applying the coating agent for forming a solid lubrication coating film according to any one of claims 1 to 12 on the solid lubrication coating film of oil

country tubular goods in which the solid lubrication coating film is formed on a thread portion.

16. Oil country tubular goods comprising:

a lubrication coating film having a solid lubrication coating film formed on a thread portion,

wherein the solid lubrication coating film is formed by dispersing a solid lubricant in a binder resin,

wherein, as the solid lubricant, black lead and a metal soap account for 95% or more of the weight of all solid lubrication components,

wherein, further as the solid lubricant, an alkaline soap accounts for 0% or more and 1% or less of the weight of all the solid lubrication components,

wherein the black lead accounts for 0.5% or more and 5% or less of the total solid lubricant in terms of a weight ratio, and

wherein the binder resin is a water-soluble or water-dispersible polymer, and the polymer is a polymer or a copolymer containing monomers classified as acrylates or methacrylates, by 90% or more of a total weight of the binder resin.

17. The oil country tubular goods according to claim 16,

wherein the black lead has an average particle size of 5 μm or less, and

wherein the metal soap has an average particle size of 5 μm or less.

18. The oil country tubular goods according to claim 16,

wherein the metal soap accounts for 0.5% or more and 5% or less of the total solid lubricant in terms of a weight ratio.

19. The oil country tubular goods according to claims 16,

wherein the water-soluble or water-dispersible polymer constituting the binder resin is a polymer composed of a single monomer of monomers to be described in the following (1) to (4) or a copolymer composed of two or more monomers of the monomers described in the following (1) to (4),

and wherein:

- (1) Monomers including acrylates, methacrylates and individual derivatives of acrylates and methacrylates, as main components;

- (2) Monomers combined with monomers including alkyl esters, vinyl esters, styrene esters, carboxylic acid esters, and individual derivatives of these esters and acrylates and methacrylates, and individual derivatives of acrylates and methacrylates;

- (3) Monomers grafted with respect to the monomers of (1) and (2);

- (4) Monomers constituted by integrating one or both monomers of a vinyl compound and a urethane compound with one or more monomers of at least one of (1) to (3).

20. The oil country tubular goods according to any one of claims 16 to 19

wherein, as the metal soap, one or two or more kinds of metal soaps which are compounds composed of a fatty acid selected from the following A group and a metal element selected from the following B group are contained, and

wherein, as the alkaline soap, one or two or more kinds of alkaline soaps which are compounds composed of a fatty acid selected from the following A group and a metal element selected from the following C group are contained,

and wherein:

- A group: stearic acid, behenic acid, lauric acid, 12-hydroxystearic acid, oleic acid, montanic acid;

- B group: Mg, Ca, Zn, Ba;

- C group: Na, K.

21. The oil country tubular goods according to any one of claims 16 to 19,

wherein the solid lubrication coating film has a film thickness of 10 μm or more and 100 μm or less and a soft film hardness of B or lower in pencil hardness.