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LUBRICANT FOR METALWORKING

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This invention has to do with the forming and drawing operations performed on sheet metals, and is specifically directed toward the lubrication of the metal to facilitate such operations.

An object of this invention is to provide a new lubricant for such operations on metal as swaging and drawing.

In many metal forming processes it is necessary to lubricate the metal being formed. For example, die stamping involves the sliding on each other of metal surfaces of the blank and the die under high pressure. Lack of an effective lubricant may result in sticking of the die to the metal, rough surfaces on the formed object, and wearing of the die parts. Lubricants are generally used to avoid these difficulties. These lubricants are usually heavy oils.

I have discovered that water sols of soluble pectates, such as those of the alkali metals, ammonium, and alkaline organic bases, are excellent lubricants for this type of work.

In my Patent No. Re. 21,077, I disclose the preparation of pectates from pectinous source materials by treatment of said source materials with alkalis. Alkali metal, ammonium, and alkaline organic base pectates can be formed by similar reactions. The source material which has been treated I call pectate pulp. This pulp may be used in many instances in lieu of the pure pectates, which may be isolated from the pulp by proper procedures, as disclosed in the above-mentioned patent.

An example of my present invention involves the lubrication of metal blanks being pressed to form the back portion of a common type of electric iron. Pressing or stamping in this instance was performed by the use of complementary steel dies. The cut blanks were lubricated with a 5% dispersion of sodium pectate pulp prepared in the following proportions:

	Kg.
Pectate pulp.....	10.0
$\text{Na}_2\text{P}_2\text{O}_7$	0.5
Na_2CO_3	0.3

This mixture was added to 200 l. of boiling water. Boiling of the mixture was continued for a short time, and vigorous agitation was employed to disintegrate the inert material and free the pectate therefrom.

In a comparison under similar circumstances it was found that the pectate sol was a lubricant equally as effective as the heavy oil previously used. The test was rather a severe one, a fairly deep drawing being obtained in a single operation. Conditions were such that absence of an

effective lubricant would allow the dies to be ruined in short order. Parts formed using pectate sols as the lubricant were smooth and no sticking was encountered.

A comparatively new development is the use of a rubber male die part, partially or not at all formed, in conjunction with a metal female die part. In this sort of stamping or forming there is a great deal of friction between the rubber and the metal being formed, since the rubber flows as the metal is formed. Lubrication under such circumstances is an important problem. One attack has been the development of rubbers or synthetic rubber-like materials which resist the deteriorating effect of the oils generally used. As is well known, most oils used for such work have an adverse action on ordinary rubber. The use of pectate sols avoids the necessity for using or discovering new materials for the die parts, since the pectates do not have any deleterious effect on common types of rubber.

Another advantage is encountered in the production of parts which it is desired to electroplate after shaping. Whereas when oils are used in the shaping operation it is necessary to provide special cleaning baths for complete removal of the oil prior to plating, the pectates may be removed by the use of hot water.

A specific application of the same problem is the substitution of pectate sols for lime in wire drawing.

The pectate pulp may ordinarily be used, and is a very economical lubricant. In some instances it may be desirable to eliminate the inert insoluble matter, and use only the pectate extracted from the pulp.

Sols including from 1% to 6% of the pectate pulp, or from 1% to 4% of the purified pectates are suitable. These limits are not absolute, but represent good practice.

While in the example given I have stated that the metal blank was lubricated, obviously the same results may be obtained by adding the lubricant to the die parts, or both may be practiced.

I claim as my invention:

1. A process for lubricating contacting metal parts in metal forming operations, comprising interposing between the contacting parts an aqueous sol including a water-soluble pectate.

2. A process for lubricating contacting parts in metal forming operations, comprising interposing between the contacting parts an aqueous sol including a water-soluble pectate.

3. A process for lubricating contacting parts of

metal and resilient material in metal forming operations, comprising interposing between the metal and resilient material an aqueous sol including a water-soluble pectate.

4. A process for lubricating contacting metal parts in die stamping operations, comprising interposing between the contacting parts an aqueous sol including a water-soluble pectate.

5. A process for lubricating contacting parts in die stamping operations, comprising interposing between the contacting parts an aqueous sol including a water-soluble pectate.

6. A process for lubricating contacting parts

of metal and resilient material in die stamping operations, comprising interposing between the metal and resilient material an aqueous sol including a water-soluble pectate.

7. A process for lubricating contacting metal parts in metal drawing operations, comprising interposing between the contacting parts an aqueous sol including a water soluble pectate.

8. A process for lubricating contacting parts in metal drawing operations, comprising interposing between the contacting parts an aqueous sol including a water soluble pectate.

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